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GRADUATE SCHOOL

UNITED STATES DEPARTMENT OF AGRICULTURE

BULLETIN



GRADUATE AND UNDERGRADUATE STUDY

Catalog Issue 1948-49

WASHINGTON ~ AUGUST 1948

This Bulletin, published annually by the Graduate School, covers graduate and undergraduate programs for the Fall and Spring Semesters and the Summer Session. It is made as accurate as possible, but the right is reserved to make changes in details as circumstances require. A bulletin on correspondence study is available to field employees of the Department of Agriculture.

Calendar for the 28th School Year, 1948-49

Fall Semester

- September 11—Registration begins
September 18—Last day of registration without payment of extra fee
September 20, Monday—Fall Semester begins
September 20 to 24—All classes begin unless other date is given in Time Schedule Bulletin
October 1—Last day of registration for credit
October 1, Friday—End of refund period and last day of registration transfer without payment of extra fee
November 5—Last day to make deferred payments
November 11, Armistice Day—No classes
November 25, Thanksgiving holiday—No classes
December 18, Saturday—Christmas holidays begin; no classes
January 3, Monday—Classes resume after holidays
January 14, Friday—Close of Fall Semester *

Spring Semester

- January 29—Registration begins
February 5—Last day of registration without payment of extra fee
February 7, Monday—Spring Semester begins
February 7 to 11—All classes begin unless other date is given in Time Schedule Bulletin
February 18—Last day of registration for credit
February 18, Friday—End of refund period and last day of registration, or registration transfer without payment of extra fee
March 25—Last day to make deferred payments
May 20, Friday—Close of Spring Semester *

Summer Session

- May 28—Registration begins
June 4—Last day of registration without payment of extra fee
June 6 to 10—All classes begin unless other date is given in Time Schedule Bulletin

* Classes which have missed sessions because of the restoration of holidays in the Federal service or for any other reason will continue until deficiency is made up.

Business Office—Room 1031, South Agriculture Building
Between 12th and 14th on Independence Avenue, SW.
Hours—9:00 A.M. to 6:20 P.M., Monday through Friday
Telephone—Republic 4142, Extension 6337

GRADUATE SCHOOL

UNITED STATES DEPARTMENT OF AGRICULTURE

BULLETIN

FALL—SPRING—SUMMER

1948—1949



*Please keep this catalog for use in
the Spring and Summer. New copies
will not be available at that time.*

WASHINGTON ~ AUGUST, 1948

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* United States Department of Agriculture.

In Memoriam

ALBERT F. WOODS, D.Sc., LL.D.,

Director 1926-1941

Director Emeritus and Educational Adviser 1941-1946

Director Emeritus 1946-1948

Special honor is due the memory of Dr. Albert F. Woods, former Director of the Graduate School, whose death, on April 12, 1948, brought to an end a career of outstanding contributions to science, education and administration. He did pioneer research in the nature of mosaic disease in plants. He was dean of the College of Agriculture and director of the Experiment Station of the University of Minnesota from 1910 to 1917; president of the University of Maryland from 1917 to 1926; director of scientific work in the Department of Agriculture from 1926 to 1934; and principal pathologist in the Bureau of Plant Industry from 1934 to his retirement from the Federal service in 1938. From 1926 through 1934, while holding positions of responsibility in the Department of Agriculture, he also served as the director of its Graduate School. From 1938 to 1941 he devoted his energies fully to the position of Director of the Graduate School. From 1941 until his retirement from the School in 1946 he served as educational adviser. During his administration the Graduate School developed a sound curriculum, gathered an able faculty, and established a scholarly standard of work.

General Information

HISTORY AND OBJECTIVES

The Organic Act which established the Department in 1862 laid upon it the duty of acquiring and diffusing useful information "on subjects connected with agriculture in the most general and comprehensive sense of the word." It was evident that the quality of its service would depend greatly on the professional preparation of its employees. The need for qualified personnel became more acute after World War I. Consequently, the Congressional Joint Committee on the Reclassification of Salaries recommended that the Government departments give more attention to the development of opportunities within the Federal Service for continued education. Accordingly, the Secretary of Agriculture appointed a special committee to find ways of helping Department employees advance professionally and improve their service to Agriculture. After consulting other Government agencies and leading educational institutions, the Secretary in 1921 established the Department's Graduate School.

In its twenty-seven years of meeting the changing educational needs of Federal employees, the School has served as a graduate school, an in-service-training institute, and an adult education organization. It has grown, in its resident program, from 10 courses and about 300 students to over 300 courses and more than 5,000 students.

The Graduate School has become a unique agency, at once an educational and service institution. First, it serves to develop and coordinate resources of the Department for educational needs; and, secondly, it functions as a link between the Department and other educational institutions which can use the Department's facilities and resources to advantage in training young men and women. President Truman, in recognizing the 25th anniversary said that the Graduate School ". . . has proved to be one of our most significant and productive instruments for better government."

The major objectives and functions are stated in the regulations issued by the Secretary of Agriculture which govern the Graduate School:

". . . Such activities shall include, but shall not be necessarily limited to, organizing, coordinating or administering, or rendering assistance therein, in cooperation with the several bureaus of the Department, and where appropriate other departments and agencies:

1. Graduate education for the convenience of employees who desire advanced degrees but find it difficult, both for personal and official reasons, to complete all study in residence at another institution;

2. Educational and experience opportunities in those subjects and areas in which the Department and Government have unique facilities and resources;
3. Cooperative programs with the land-grant and other institutions and agencies under which members of these institutions and agencies may utilize to advantage educational and experience opportunities represented by the unique facilities and resources of the Department and Government;
4. Programs under which Department employees may take advantage of educational and experience opportunities, related to their work in the Department, at the land-grant and other institutions and agencies;
5. Educational opportunities for employees to train themselves, on their own time and at their own expense, for proficiency in their present positions and for advancement to positions of greater responsibility;
6. Opportunities for professional, administrative and technical employees to keep abreast of latest developments in their respective fields so that they may perform more effectively the responsibilities assigned to them;
7. Cultural, creative and leisure time opportunities;
8. Cooperation, on behalf of the Department, with other departments and agencies in undertakings designed to develop, through educational activities, the improvement of the service and the increasing of employee usefulness."¹

ADMINISTRATION

The organization and administration of the Graduate School are simple and effective. The government of the Graduate School is vested in a General Administration Board appointed by the Secretary of Agriculture. Functions of this Board, made up of administrative and scientific officials of the Department, correspond in general to those of boards of trustees of universities. The Board sets policy, serves as the reviewing and approving authority in connection with the annual budget, and functions generally with respect to problems at this level. The School is administered by a director and a small administrative staff. It is a self-supporting non-profit institution and receives no Federal funds.

Both the formal educational programs and activities of an educational service nature are organized and supervised by committees composed of persons with broad backgrounds and recognized competence. Membership in these committees is drawn from agencies throughout the Federal service as well as from universities and other sources. The resident program in Washington is organized into eight departments. The departmental committees, with assistance of subcommittees, are charged with the responsibility of

¹ "United States Department of Agriculture Regulations Governing the Graduate School of the Department of Agriculture Promulgated Pursuant to the Authority Contained in the Act of May 15, 1862 (R. S. § 520 (1878), 5 U. S. C. § 511 (1940)), the Joint Resolution of April 12, 1892, 27 Stat. 395, and the Deficiency Appropriation Act of March 3, 1901, 31 Stat. 1010, 1039 (20 U. S. C. Sec. 91 (1940))." (Revised February 21, 1947.)

organizing, evaluating, readjusting, and giving general administrative direction to the programs for which they are responsible.

PROGRAM OF THE GRADUATE SCHOOL

Organized, formal educational programs in the Graduate School center in Washington, where opportunities are provided for graduate and undergraduate work. The educational needs of field employees usually are met by enlisting the cooperation of local institutions. In some cases, however, such needs are met through short courses or institutes for groups of employees. Correspondence study aids Agriculture employees in isolated areas or in subjects not otherwise covered.

The Graduate School also helps to coordinate the educational interests of the Department's bureaus. It affords means whereby graduate students and faculty members from land-grant and other institutions may use the Department's research resources. It cooperates in the assistance given by the Department in the orientation and training of students from foreign countries, of agricultural attaches, and of university and Federal officials in special fields such as marketing and public administration and carries on other related functions and activities.

The Graduate School cooperates with other educational institutions throughout the country. This cooperation may have many facets. It may include, with institutions in the same geographical area, the joint offering of courses, the sponsoring of lectures, or joint assignments for faculty members. With other institutions the cooperation may include mutual aid in program development, study of courses in particular fields, and strengthening of the curriculum as the need appears. The type and the extent of the cooperation correspond as nearly as possible to the requirements of the students and the facilities of the cooperating institutions.

RESIDENT EDUCATIONAL PROGRAM IN WASHINGTON

The curricula consist chiefly of courses in the biological, physical and social sciences, in languages and literature, in mathematics and statistics, in public administration, in Federal clerical and administrative techniques, and in the mechanical arts. It is these curricula to which this BULLETIN is devoted. They reflect the interests and needs of the Federal service in various levels and types of work. Seminars or lecture series with discussion facilities are provided for advanced graduate students and for the higher scientific and administrative officials. Other courses in the arts and sciences provide Federal employees with broad opportunities for

continuation study along the lines of their general interest as individuals as well as their special interests as employees. The curriculum is planned to enable students to continue their work toward undergraduate and graduate degrees.

The program of the School is based on the belief that work and study can be combined to the advantage of both, work giving meaning and motive to the learning process, and study supplying understanding and competence to the work situation. The School also operates in the conviction that after-work activities and off-the-job environment have a vital relation to morale and performance on the job. Given after hours and at the students' own expense, courses are open to the employees of other Government agencies, and to non-Federal persons as well, to the extent that the facilities permit.

Each year the program includes several series of lectures. Authorities of national and international standing discuss topics of general or technical interest. Usually the technical lectures are parts of advanced seminars. Information about lectures planned for 1948-49 will be found in sections of this BULLETIN devoted to the several departments of instruction. During the course of the year, special announcements on these and other lectures will be issued.

COOPERATION WITH UNIVERSITY OF MARYLAND

To provide broader educational opportunities for those served by each institution, the Graduate School of the United States Department of Agriculture and the University of Maryland have developed a cooperative arrangement under which certain resources of each institution are made available to students of both institutions. Representatives of certain subject matter departments at each institution are engaged in developing integrated educational programs.

Under these arrangements, work taken at the Graduate School of the United States Department of Agriculture may be applied as partial residence credit toward undergraduate or advanced degrees at the University of Maryland. Those wishing to take advantage of this arrangement must work out an approved program of study in consultation with appropriate officials at the University of Maryland. This should be done at a point as early as possible in their programs.

Graduate School students wishing to take advantage of these opportunities may secure instructions from the Registrar.

GENERAL INFORMATION

GRADUATE SCHOOL PUBLICATIONS

Publications of the Graduate School include:

1. A general annual BULLETIN which contains detailed information about the resident educational program in Washington, D. C.
2. Time Schedule and Supplement, published each semester—fall, spring and summer—which carries added details about the resident educational program in Washington.
3. Books and periodicals, published at irregular intervals containing: original contributions by faculty members; special lectures on subjects devoted to the advancement of the arts, the sciences, and in particular to the development of literature in the field of better government; and significant manuscripts prepared by employees of the Department of Agriculture, which the Department has been unable to publish. A partial list of these publications is given on the outside back cover of this BULLETIN.

FACULTY

The School has always emphasized the human, non-physical element—teachers and students—in the educational process. The faculty is drawn almost entirely from the Federal service, a source of talent and expertness unexcelled anywhere in the nation. Professional competence is the sole criterion of selection. Faculty members combine excellent academic training, college teaching experience, and daily practice in the application of the subject matter taught.

The tradition of a strong faculty in the Graduate School dates from its first year. The following men comprised the initial staff of ten:

Natural Sciences

- *Dr. C. O. Appleman, now Dean of the Graduate School, University of Maryland.
- *Dr. Burton E. Livingston, now Professor Emeritus of Plant Physiology, Johns Hopkins University.
- *Dr. C. L. Shear, now retired; formerly Principal Pathologist in charge of Mycology and Disease Survey, USDA.
- *Dr. Richard C. Tolman, now Professor of Physical Chemistry and Mathematical Physics, California Institute of Technology.
- *Dr. Edgar T. Wherry, now Professor of Botany, University of Pennsylvania.
- *Dr. Sewall Wright, now Burton Distinguished Service Professor of Zoology, University of Chicago.

* Starred in *American Men of Science* for distinction in his special field.

Social Sciences

Dr. Alexander E. Cance, now Professor Emeritus of Economics, University of Massachusetts.

Dr. Henry C. Taylor, now Agricultural Economist, Farm Foundation; formerly Chief, Bureau of Agricultural Economics, USDA.

Mr. Howard R. Tolley, now Chief Economist, Food and Agriculture Organization; formerly Chief, Bureau of Agricultural Economics, USDA.

Dr. Oscar C. Stine, Assistant Chief for Prices and Marketing, Bureau of Agricultural Economics, USDA.

COUNSELING SERVICES

Careful planning is important for any prospective student, but particularly so for the Federal employee who wishes to make a substantial beginning in his educational program through the Graduate School, where degrees are not granted and credits must eventually be transferred to a degree-conferring institution.

The most vital factor in studying for a degree is the setting up of a program which includes a group of logically related courses in a special field of scientific or professional study. It is essential that the student have general knowledge of the scope of the field in which he is working or in which he plans to secure his degree. Unless his courses are reasonably related to form an organic field of study, he may be disappointed in the amount of credit which will be granted him when he transfers to another school.

Officers of the Graduate School are available, throughout the registration periods and from 9:00 a.m. to 5:00 p.m. each day for counseling on educational plans, whether courses are to be pursued in the Graduate School or in other institutions. In addition, where necessary, arrangements are made to refer persons having special problems to authorities in the particular field of work or study.

LIBRARY FACILITIES

The Department of Agriculture Library, containing over half a million books, is the Graduate School Library. It is open to students from 8:30 a.m. to 8:30 p.m., Monday through Friday, and 9:00 a.m. to 1:00 p.m. on Saturdays. Special collections of books, designated as required reading by the instructors, are available for use in the Reading Room or for circulation to Graduate School students. Other libraries in the District—The Library of Congress, public libraries and libraries of Government agencies, offer excellent opportunities for study and research.

ACCREDITMENT

The Graduate School does not grant degrees and has never sought that authority; therefore it has not asked to be accredited by any of the accrediting agencies. It prefers to give courses of standard graduate and undergraduate grade; to have the merits of these courses judged by the caliber and well-known competence of its instructors; and to cooperate with existing institutions having degree-granting authority.

The United States Civil Service Commission accepts Graduate School credits, the same as those from accredited colleges and universities, for examination and qualification purposes.

GENERAL GRADUATE DEGREE REQUIREMENTS

Graduate students should arrange their programs in advance through the dean of the graduate school of the institution from which the student contemplates taking his degree. Latest catalogs of representative colleges and universities are available for examination in the Graduate School business office. Catalogs of the Land-Grant Colleges are available for examination in the Department of Agriculture Library.

Master's Degrees. Degree-granting institutions will generally permit six semester hours of graduate credit to be transferred from another institution, including the Graduate School of the Department of Agriculture. Some institutions require that all study for the Master's degree be taken in residence. In other institutions more than six hours may be transferred from the Graduate School of the Department of Agriculture when the additional work is taken with the prior approval of the head of the student's major department and the graduate dean.

Doctor's Degrees. Almost universal academic practice permits the graduate student to complete two of the three years' work necessary for the doctorate outside the degree-granting institution, or a year beyond the Master's degree. Most students will find it advantageous to take the last year in residence.

Undergraduate Deficiencies. Graduate schools generally permit deficiencies to be made up out of residence. Those students who have deficiencies pointed out by their graduate deans may make them up in the undergraduate courses offered by the Graduate School of the Department of Agriculture.

Language Requirements. It is possible for graduate students to complete their preliminary language requirements and introductory course requirements subject to optional examination by the degree-granting institution.

CERTIFICATION

Inclusion in Personnel Record for Department of Agriculture Employees. To aid in effecting its promotion-from-within policy, the Department has provided (Personnel Circular No. 144, dated September 22, 1944) that Graduate School credits earned by its employees will be placed in official personnel files of the bureau and the Central Office of Personnel. Unless specifically requested by the employee that such action not be taken, the Graduate School will forward, upon completion of the courses or at the end of the year, two copies of the student's record, without cost to the employee, to the personnel officer of the administration, bureau or office in which the student is employed.

Certification on Request. Upon a student's written request, an informational record of his work at the Graduate School will be sent to him or to an organization designated by him. An official transcript of academic credit to be transferred to a college or university will be made only when the student has filed with the Graduate School a transcript of his previous academic work showing that he has met all requirements for admission to the level of the courses for which he registered.

CERTIFIED STATEMENTS OF ACCOMPLISHMENT

Certified Statements of Accomplishment are offered in the fields of Accounting, Administrative Procedures, Agricultural Economics, Public Administration, and Statistics upon the student's completion of specified programs of study. For complete details see the outlined program in the Department concerned.

These statements are offered to encourage the student to complete a well-rounded approach to his chosen field of study or work, so that he may more competently discharge his present and prospective responsibilities as a public servant. Courses completed and the quality of accomplishment are recorded on the back of the statement which may be used as a personal record of achievement or a public record of qualification.

Regulations and Procedures

ADMISSION

Admission to resident courses in the Graduate School is open to all qualified employees in the Federal service, and to such other qualified individuals as facilities will permit.

VETERANS

Graduate School courses are available to veterans of World War II under the provisions of Public Laws 346 and 16. Registration for part-time study is charged against educational benefits only in the proportion that the number of semester hours bears to a full normal load.

Veterans intending to enroll in the Graduate School should apply as soon as possible to the Regional Office of the Veterans Administration for an official certificate of eligibility and entitlement showing the amount of educational benefits to which they are entitled. This certificate of entitlement will be accepted by the Graduate School in lieu of tuition fees and charges for books and supplies.

In cases where an official certificate has not been received prior to the time of registration, the veteran will be required by the Graduate School to pay at least one half of his tuition plus whatever fees may be applicable, with the understanding that course fees will be refunded retroactive to the effective date on the letter of entitlement.

ENTRANCE REQUIREMENTS

Since the Graduate School does not offer degree programs, entrance requirements differ with the level of the course for which the student is registering.

COURSE PREREQUISITES

Undergraduate courses, in general, are open to persons who are graduates of a standard high school or equivalent or who qualify for the course because of satisfactory work experience. For admission to more advanced courses college work in the same or related field is specified or understood. For other courses definite prerequisites may be stated. Year courses require the completion of the work of the first semester or its equivalent.

COURSE LOAD

Students employed full time may not carry more than two courses. Should they wish to register for an additional course, permission must be secured from the Registrar.

CLASSIFICATION OF COURSES

1. The courses of study offered are classified according to aim, amount of advancement, or subject matter.
2. According to amount of advancement, some courses are for undergraduates only, others for undergraduates of sufficient maturity or graduates, and still others for graduates alone.
3. Courses are numbered according to degree of advancement of the course: below 100, non-credit; 100-399, undergraduate; 400-699, graduate and advanced undergraduate (senior); above 699, graduate.
4. The value of the course in semester hours is given below the course title.

REGISTRATION REGULATIONS

Registration. Registration is during the periods scheduled in the School calendar, see inside front cover. Students will register in the School office, Room 1031 South Building, or in such other rooms as will be designated. Mail registration forms will be supplied on request. After October 1 in the fall semester, February 18 in the spring, and June 13 in the summer, students may enroll for credit only with the approval of the instructor and the Registrar. Registration is not completed until the required fees have been paid. When the limitation set for each course is reached, registration for that course is closed. The Graduate School reserves the right to cancel any course if registration does not warrant continuance.

Opening Date. The twenty-eighth year of the Graduate School opens Monday, September 20, 1948. All classes begin during the week starting on that date. The fall and spring semesters run fifteen weeks each and the summer session ten weeks. Spring semester classes begin on February 7 and the summer session on June 6.

ATTENDANCE AT CLASSES

Students are expected to attend all class sessions and not to absent themselves without adequate reason.

Absences do not relieve the student from responsibility for work required while he was absent, and the burden of proof that the work was done rests with the student. In courses in which the work cannot be satisfactorily tested by written examination, the instructor shall be the judge of the relation of the student's attendance or non-attendance to his grade. All auditors, and other students carrying

undergraduate courses who do not make up all required work, who are absent more than 25 per cent of the class periods will receive a mark of "W," withdrawn.

WITHDRAWAL

Withdrawals are permitted only under justifiable circumstances. A student who is obliged to withdraw from the Graduate School or from a course must immediately notify the Registrar.

Withdrawal from a course or from the Graduate School, without academic or financial penalty, requires the permission of the Registrar. Permission to withdraw will not be granted to a student who does not have a clear financial record. Reporting the dropping of a course to an instructor does not effect its discontinuance.

CREDIT AND GRADES

Academic Credit. Persons registering for academic credit must satisfy all prerequisites for admission to the course as generally stated or specified in the course description.

Audit. An auditor must meet the same prerequisites as a credit student. He receives full privileges of class participation if he chooses to exercise them. An auditor does not receive a grade; he receives only a mark of AUD.

Grades. At the close of the semester students registering for credit receive written notice by mail of grades received.

TRANSFER OF CREDIT

An official transcript of academic credit earned at the Graduate School will be made for each student requesting it if he has filed with the Graduate School a transcript of his previous academic work. This must show that the student has met all requirements for admission to the level of the courses for which he registered and for which he wishes official certification.

FEES

Course Fees. In general, fees are computed at \$8.00 per semester hour credit for strictly undergraduate courses and \$9.00 per semester hour for graduate and advanced undergraduate courses.

Late Fees. There will be a \$2 late registration fee and a \$1 late transfer fee as shown in the School Calendar.

Laboratory Fee. Laboratory or materials fees are listed in the Schedule of Classes for each semester, in connection with the courses for which they are charged.

Service Fee. A fee of \$1 per course is charged each student using the deferred payment plan.

Transcript Fee. There will be a fee of 50¢ for each copy of a student's record on the regular Graduate School form or on the form of another institution or state board of education.

PAYMENT OF FEES

Fees are due and payable in advance at the time of registration. Registration is not complete and no student is permitted to attend classes until all fees have been paid.

In exceptional cases, subject to the approval of the Registrar, the student may sign a contract permitting payment of one-half of the fees at the time of registration plus a \$1.00 service charge and the balance on or before November 5 in the fall semester, March 25 in the spring semester and July 8 in the summer session.

A student who fails to meet payments when due will be suspended and may not attend classes until he has been reinstated and has paid all accrued fees as well as a reinstatement fee of \$2.00.

All fees are payable at the Graduate School business office, Room 1031, South Building, United States Department of Agriculture.

WITHDRAWAL WITH REFUND OF FEES

Application for withdrawal or change in class schedule must be made in person at the Graduate School business office. Notification to an instructor is not acceptable notice. Since commitments for instruction and other arrangements are necessarily made in the beginning of the semester, no refund of fees can be made except as herein indicated.

Withdrawals with refunds are permissible under justifiable circumstances upon written request of the student made within the refund period for each term on or before: October 1 in the fall semester, February 18 in the spring semester and June 13 in the summer session. When a student is granted permission to withdraw within this refund period, his fee minus a \$3.00 registration charge for each course will be refunded.

When a student is permanently transferred by official action out of the Washington area and he has been given permission to withdraw, his tuition fee, minus a \$3.00 registration charge for each course, will be refunded in the amount proportionate to the unexpired portion of the semester. No refund will be made of laboratory and other incidental fees. Written evidence of such transfer must be presented. Permission to withdraw with refund will not be granted in cases arising out of the student's voluntary action.

All adjustments are made as of the date on which application for withdrawal with refund is received. In no case will tuition be reduced or refunded because of non-attendance in classes.

Authorization to withdraw and certification for work done will not be given to a student who does not have a clear financial record. Students withdrawing under request from the Graduate School are not entitled to any return of fees.

TEXTBOOKS

The Graduate School maintains a bookstore for the convenience of the students in Room 1041, South Agriculture Building. Due to the continued shortage of college textbooks, it is suggested that students purchase their books at the time of registration. The book store will be open during registration hours and from 4:30 p.m. to 5:30 p.m., Monday through Friday, during the remainder of each semester.

ROOM ASSIGNMENTS

Classroom assignments, insofar as practicable, will be given the student at the time of registration. A complete schedule of room assignments will be posted a week before the beginning of classes for each term on bulletin boards outside of Room 1031, and in the north entrances of the fourth and seventh wings, of the South Building, United States Department of Agriculture.

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The Graduate School reserves the right to cancel any course if registration does not warrant continuance; to change instructors; to make any changes deemed advisable in registration and in fees; and to require the withdrawal of any student at any time for such reasons as the School deems sufficient.

Department of Biological Sciences

DEPARTMENTAL COMMITTEE

ALBERT H. MOSEMAN, Ph.D., Assistant to the Chief of Bureau, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA (Chairman)

HOWARD P. BARSS, M.S., Principal Botanist and Experiment Station Administrator, Office of Experiment Stations, Agricultural Research Administration, USDA

F. C. BISHOPP, Ph.D., Assistant Chief, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, USDA

EDWARD H. GRAHAM, Ph.D., Chief, Biology Division, Soil Conservation Service, USDA (Vice-chairman)

LESLIE A. SANDHOLZER,* Ph.D., Bacteriologist, In Charge, Fishery Technological Laboratory, Fish and Wildlife Service, Department of Interior

BENJAMIN SCHWARTZ, Ph.D., Chief, Zoological Division, Bureau of Animal Industry, Agricultural Research Administration, USDA

WILLARD H. WRIGHT, Ph.D., Chief, Division of Tropical Diseases, National Institute of Health, U. S. Public Health Service, Federal Security Agency

R. Y. WINTERS, Ph.D., Research Coordinator, Agricultural Research Administration, USDA

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Familiarity with basic biological subjects is considered an important adjunct to those engaged in economic and social, as well as the physical, aspects of government. Keeping abreast of the latest developments in the actively growing field of biology is necessary for many persons professionally employed in agriculture and related fields. The Department of Biological Sciences offers the courses listed below with the conviction that they will aid Federal employees in obtaining knowledge either of the fundamentals of or the most recent developments in selected biological subjects.

Elementary courses are intended as an introduction to subjects in which members of the Department of Agriculture or other Federal agencies require general knowledge. Courses in recent advances are usually of a seminar nature, and provide for a maximum of discussion of new developments by those working in such fields or related activities. Outstanding specialists from Federal and other research institutions participate.

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Course Numbers and Symbols—Below 100, non-credit; 100-399, undergraduate; 400-699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

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[110.] General College Biology (1949-50 and alternate years)

HENRY W. OLSON

* Deceased.

250. Bacteriology

Fall, 4 credits

HENRY W. OLSON

A study of the morphology and physiology of bacteria. Training is given in the preparation of various culture media, in methods of sterilization, in staining techniques, in the cultivation and identification of bacteria, and in standard methods of water and milk analysis. The class meets in the Biology Laboratory of Wilson Teachers College, 11th and Harvard Sts., N. W. *Prerequisite:* College biology.

320. Human Physiology

Spring, 4 credits

HENRY W. OLSON

A course in human physiology intended to give the student a basic knowledge of the structure and functions of the systems of the body: the circulatory, respiratory, digestive, nervous, skeletal, reproductive, and endocrine. The laboratory work includes dissection of organs, experiments on digestion, nutrition, the nervous system, sense organs, microscopic examination of tissues, and has been planned to give the student a better understanding of the methods of scientific investigation. The class meets in the Biology Laboratory of Wilson Teachers College, 11th and Harvard Sts., N. W. *Prerequisite:* College biology.

209. Systematic Botany—Principles of Classification

Fall, 2 credits

SIDNEY F. BLAKE

An introductory course intended to give those with no previous experience in systematic botany an acquaintance with the subject sufficient to enable them to use the ordinary manuals to advantage. Begins with a study of the morphology of the flower, fruit, leaf, stem, and other parts used in classification and of the technical terms used in describing them. A survey of the principal families of flowering plants with discussion of their distinctive characters and mention of the economically important species, illustrated by herbarium specimens; and a summary of the principal systems of plant classification. *Prerequisite:* College biology or consent of instructor.

210. Systematic Botany—Identification Techniques

Spring, 2 credits

SIDNEY F. BLAKE

Devoted to the identification of wild plants of this region by the use of Gray's Manual of Botany, giving the student familiarity with the descriptive terms used and a first-hand acquaintance with the principal plant families. One or more short field trips will be made. *Prerequisite:* College biology, systematic botany, or consent of instructor.

213. Identification of Local Plants

Summer, 2 credits

AUGUSTINE V. P. SMITH

An elementary course, with no prerequisites, dealing with the process of determining the names of the plants, both wild and cultivated, trees, shrubs, herbs and wild flowers, of the vicinity of Washington, D. C. The work will include discussion of the books and keys to the plants, the language they are written in, and how to use them. Most of the work will be with actual plants, largely those brought in by the students or gathered on class field trips. Instruction and demonstration will be given in the methods of pressing, drying, and mounting plant specimens.

214. Birds of the Washington Area

Summer, 2 credits

CHANDLER S. ROBBINS

Introduction to birds of the District of Columbia region, stressing field identification, but touching on classification, distribution, migration, nesting, ecology and research methods. Museum collections of birds will be inspected and recordings of bird songs will be available in addition to the field trips.

201. Beekeeping

Spring, 2 credits (alternate years)

W. J. NOLAN

A survey of the basic principles underlying modern beekeeping practice. Consideration will be given to the organization of the honeybee colony, bee behavior, apiary and honey-house equipment, types of honey-flows, honey-producing regions of the U. S., bee diseases, swarming, wintering, pre-honey-flow management, extracted and comb honey production, harvesting and storing honey, marketing, pollinating activity of the honeybee, bees-wax, queen rearing, package bees, races, and bee breeding. *Prerequisite:* Course in biology or consent of instructor. Prior experience with bees desirable but not essential.

300. Fundamentals of Entomology

Spring, 3 credits

REECE I. SAILER

An introductory course designed to provide the student with the basic elements of entomology. Recognition of the principal orders of insects and their important families is stressed. A study of the terminology and identification with the anatomical structure of insects. Attention is given to the biology of insects and to their phylogenetic and ecological relationships to other organisms. Lectures, discussion, laboratory and Saturday morning field trips. *Prerequisite:* Basic training in biology or consent of instructor.

512. Medical and Veterinary Entomology

Year, 2 credits each semester

F. C. BISHOPP

A timely general course in medical entomology with emphasis on the practical aspects of this important field. The biology, habits, and relation to disease of insects, spiders, mites, and ticks, are discussed. How these arthropods affect man and animals as intermediate hosts, or carriers of disease-producing organisms, is given attention and special consideration is given methods of control. The adaptation of known control procedures to present-day problems is considered. Features of the course include lectures by outstanding specialists in this general field and round-table discussions of practical problems. *Prerequisite:* Basic training in entomology or consent of instructor.

518. New Developments in Insecticides

Spring, 2 credits (alternate years)

F. C. BISHOPP and SPECIALISTS

Outstanding specialists in the field of insecticides will discuss various aspects of this subject which has advanced so rapidly during and since World War II. The chemistry, manufacture, pharmacology, compounding, methods of application, and equipment will be treated. Discussions will include the usefulness of insecticides in protecting man, clothing, buildings, houses, livestock, gardens, fruit, field crops, forests, and stored products from insect attack. Practical problems involved in the use of various insecticides and fumigants will be dealt with and a review of literature made. *Prerequisite:* Basic courses in biology or chemistry or consent of instructor.

[519.] New Developments in Fungicides (1949-50 and alternate years)

M. C. GOLDSWORTHY and SPECIALISTS

[603.] Advances in Plant Breeding and Genetics (1949-50 and alternate years)

F. J. STEVENSON and SPECIALISTS

620. Advances in Weed Control Practices

Fall, 2 credits (alternate years)

L. W. KEPHART, LEWIS S. EVANS and SPECIALISTS

A presentation of theoretical and practical aspects of weed control in relation to agricultural economy, including classification, distribution, development, and destruction of weeds; the description and classification of herbicidal compounds; and control by mechanical, biological, and competitive cropping practices. Attention will be given to methods of weed control in field crops, horticultural crops, lawns and turf, and in special situations including non-agricultural lands, irrigation systems, etc. *Prerequisite:* A basic knowledge of plant physiology or related subjects.

[609.] Recent Developments in Plant Physiology and Plant Nutrition (1949-50 and alternate years)

FRANK P. CULLINAN and SPECIALISTS

[700.] Progress in the Field of Antibiotics (1949-50 and alternate years)

GEORGE W. IRVING, JR., H. T. HERRICK and SPECIALISTS

701. Virus Diseases of Man and Animals

Spring, 2 credits

KARL HABEL and SPECIALISTS

A specialized graduate course for those interested in the virus field. Lectures by specialists followed by group discussions on the more recent advances in animal and plant virus studies and techniques, including fundamental considerations and practical applications in the research and clinical fields. *Prerequisite:* Graduate study or responsible work in related fields.

Department of Languages and Literature

DEPARTMENTAL COMMITTEE

LESTER A. SCHLUP, B.C.S., Chief, Division of Extension Information, Extension Service, USDA (Chairman)

GEORGE E. BEAUCHAMP, Ph.D., Chief, Publications Control Unit, Bureau of the Budget
HENRY LEE SMITH, JR., Ph.D., Assistant Director, Foreign Service Institute, in charge of the School of Languages, Department of State

J. KENDALL McCLAREN, Head, Division of Information, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA

M. C. MERRILL, Ph.D., Chief, Division of Publications, Office of Information, USDA
RALPH R. SHAW, M.S., Librarian, USDA (Vice-chairman)
ROBERT L. WEBSTER, M.S., Associate Director, Office of Information, USDA

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IMPORTANCE OF ENGLISH WRITING AND SPEECH

Among students preparing for technical careers and among busy people employed on the basis of their technical competence, there is an inevitable tendency to concentrate on subject-matter specialties, to the great neglect—if not exclusion—of the auxiliary subjects that can effectively implement such specialties. It is common knowledge in the Government service that nothing so much retards the progress of many young technicians, scientists, and other professional personnel as their inability to incorporate the results of their thinking and of their research in effective, concise, lucid English, written or oral. Technical knowledge is of no value unless it can be communicated to others. There are indeed few persons who cannot greatly benefit from the further sharpening of their tools of communication.

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Course Numbers and Symbols—Below 100, non-credit; 100–399, undergraduate; 400–699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

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ENGLISH AND LITERATURE

222^a. English Composition

Fall, 3 credits. Repeated in Spring and Summer

FRANCES H. MILLER

Equivalent of freshman English. An introductory course in writing and English usage, designed especially for those who need a course preparatory to more advanced English studies. Special attention given to the fundamental principles and mechanics of good writing—grammar, punctuation, spelling, dictation, etc. Exercises in writing short and long themes and in studying, analyzing, and evaluating selected English prose texts.

222^b. English Composition

Spring, 3 credits

KATHRYN PAINTER WARD

Continuation of course 222^a above.**223. Descriptive English Grammar**

Fall, 2 credits. Repeated in Spring and Summer

KATHRYN PAINTER WARD

A course in the study of grammatical principles, stressing sentence structure and correct English form. Lectures on the history and development of inflectional and derivational forms. Exercises in diagramming and in analyzing examples of good and bad English.

118. Practical English Usage

Fall, 2 credits. Repeated in Spring and Summer

CHARLOTTE L. WHITE

This course enables students through practice to master the fundamentals of correct English. Troublesome problems of English usage, sentence structure, choice of words, style, and grammar, are studied as aids to clear and forceful writing of letters, memoranda, and reports.

119. Vocabulary Building

Fall, 2 credits. Repeated in Spring and Summer

CHARLES D. MURPHY

Designed to help writers and speakers express ideas clearly and attractively. It embraces word study and selection, diacritical markings, synonyms and antonyms, prefixes and suffixes, usage exercises, and other means of developing a broad and useful command of words.

51. English for Foreign Students

Fall, non-credit. Repeated in Spring

MARION H. YOUNG

A course designed to meet the needs of students with a foreign-language background. Includes practice in correct and fluent expression in writing and speaking with emphasis on diction, vocabulary, and study of idiom and difficult grammatical expressions.

330. Great Books

Year, 2 credits each semester *

M. CLARE RUPPERT

Group discussion, under leadership, of important works in poetry, history, philosophy and criticism. The leader will try to help with the reading and understanding, but the books themselves will be the teachers. The intention of the course is to give insight into perennial, and therefore contemporary, problems, not historical and literary information. The only qualifications required are an interest in ideas and belief in free discussion. With few exceptions the books will be read in their entirety. One, two, or three meetings will be given to a book depending upon its length. Discussion will center around the following authors:

Fall Semester: Sophocles, Aeschylus, Thucydides, Plato, Lucretius, Virgil, Homer, Tacitus, Herodotus, Marcus Aurelius, Augustine.

Spring Semester: Dante, Machiavelli, Shakespeare, Cervantes, Bacon, Hobbes, Rousseau, Swift, Kant, Marx, Henry Adams.

310. English Drama

Year, 2 credits each semester *

KATHRYN PAINTER WARD

The first semester will be concerned with the development of English drama from its beginning through the work of Shakespeare to 1642, the date of the closing of the theaters under the Commonwealth. The second semester will include a study of significant plays in English drama from 1660 to 1900 supplementing the first semester.

* Students may attend both semesters or either semester.

mented by readings from contemporary American dramatists such as: Eugene O'Neill, Maxwell Anderson, and Thornton Wilder. Lecture and class discussion, written dramatic criticisms.

340. Trends in Contemporary Literature

Summer, 2 credits

DELIGHT WILLIAMSON HOLT

Analyzes dominant tendencies in contemporary literature, that is, literature between the two World Wars, examining historic origins of these trends; the evolution of our thought patterns; the influence of social, economic and political developments; and general and individual stylistic tendencies. Reading assignments in fiction and in non-fiction will be made. Attention will be focused on the American literary scene, but a few significant works by foreign authors which have been written in or translated into English will be considered. Students will, through direction, develop a sense of literary style and a fuller understanding of human nature in terms of the forces it reacts to, and how and why it reacts. In addition to reading and class discussion, work of the course will consist of written reports and reviews.

SPEECH

COMMITTEE ON SPEECH

GEORGE E. BEAUCHAMP (Chairman)

WALTER B. EMERY, Ph.D., Attorney, Federal Communications Commission MARY E. MOHLER, M.A., Assistant Chief, Publication Clearance Unit, Bureau of the Budget.

228. Fundamentals of Speech

Fall, 2 credits. Repeated in Summer

MARY E. MOHLER

Through the preparation and delivery of short original speeches the student gains poise, assurance, and the ability to express himself clearly and accurately. Strict adherence to time limit quickens mental processes and develops discrimination in the selection of speech material. Voice, articulation, and pronunciation drills. Posture, movement, and gesture. Learn to speak by speaking at each class meeting. Constructive criticism.

229. Public Speaking

Spring, 2 credits

MARY E. MOHLER

Theory and practice of effective speaking through: (1) audience analysis, (2) organization of speech material to achieve a specific response, (3) delivering speeches for special occasions (radio, good will, welcome, presentation, acceptance, etc.), (4) planning an interesting and dramatic meeting, (5) officiating at banquets. Each student speaks at every class meeting. It is assumed that the student has some knowledge or experience in speech making.

400. Effective Speaking

Fall, 2 credits

GEORGE E. BEAUCHAMP

A course designed for persons who have previously had a beginning course or some practical experience in public speaking. Special attention is given to types of speeches, organization and writing of speeches, and effective delivery.

567. Principles of Persuasion

Spring, 2 credits

ROBERT T. OLIVER and GEORGE E. BEAUCHAMP

Human motivation as exemplified in basic principles of persuasive thinking is analyzed and practiced in speeches and letters; the influence of emotion, rationalization, stereotypes, prejudice, and the will-to-believe are stressed.

205. Oral Interpretation

Spring, 2 credits

MARY E. MOHLER

A fundamental course designed to develop appreciation of the content and emotional values of poetry and prose. Stress in techniques of reading aloud, analysis of thought, and development of imagination. Recording equipment will be available for class use.

234. Correction of Speech Dialect

Spring, 2 credits

WALTER B. EMERY

Designed for persons having local or foreign dialect wishing to acquire standard American pronunciation and speech; intensive phonetic studies and drills to help the student hear properly and produce correctly American speech sounds and to avoid deviations therefrom; special reading and speaking exercises to improve diction and conversational ability; training is designed to serve individual needs.

232. Voice and Remedial Speech

Fall, 2 credits. Repeated in Summer

WALTER B. EMERY

Study and intensive drills in voice production, flexibility, range, articulation, and enunciation. Training and practice are designed to improve vocal conditions for all speech purposes and to remedy minor speech difficulties. In order that students may receive more individual attention, registration is limited to twenty.

This course is intended to improve the normal voice and minor speech difficulties. Prospective students with major speech difficulties are urged to enroll in the Speech Clinic.

50. Speech Clinic

Fall, non-credit. Repeated in Spring and Summer

WALTER B. EMERY

A speech clinic has been organized as a service to Graduate School students. The clinic is designed to help correct serious abnormal speech disorders. Private consultation and practice with instructor 20 minutes per week for 15 weeks. Schedule of evening or Saturday appointments to be arranged with the instructor. Limited to 8 students.

305. Radio—Writing and Speaking

Spring, 2 credits

E. J. ROWELL

This course is designed for those who are interested in broadcasting the human voice, pointing up the desirable qualities which make for radio broadcasting. A condensed study of our two languages, that for the ear and that for the eye, will be made. Preparation and presentation of talks, interviews and conversations, including exercises in voice control and microphone techniques.

PRESENTATION METHODS

Primitive man usually communicated with his fellow tribesmen through the spoken word. Today we would be limited indeed if our only method of communication were the spoken word. Fortunately we have many methods of communication at our disposal, both for pleasure and for business. Special techniques have been developed for each method, each of which has proved to be successful in presenting information and knowledge about certain subjects to particular groups or individuals.

320. Introduction to Public Information Media

Fall, 2 credits

RICHARD FITZPATRICK

Presenting to the public current, accurate, objective information is essential in democratic government. The course will include a review of the interrelation of public opinion, public interest and public information; the importance, potentialities and issues of mass communication; evaluation of the use and effectiveness of newspapers, magazines, books, radio, facsimile, television, motion pictures, and advertising as channels of public information; limitations on the effectiveness of mass media; propaganda and censorship; and mass communication in the international field. Opportunities in public information as a profession will be discussed. *Prerequisite:* Background in any social science or practical experience in editorial or informational work.

240. Audio-Visual Aids in Information and Education

Fall, 2 credits

SEERLEY REID and R. L. WEBSTER

A survey of the many ways audio-visual aids can be used in training, employee relations, and information and education programs. Covers not only newer materials such as motion pictures, filmstrips, and recordings, but also modern uses of photographs, charts, graphs, maps, and the like—even the art of using a blackboard. Gives practical suggestions on the most effective use of these aids for different purposes—developing physical skills, imparting information, changing attitudes, and otherwise influencing human behavior. Lectures and demonstrations with guest speakers presenting material on special topics. Each student will have the opportunity to choose his own problem for intensive study.

225. Principles of Editing and Their Application

Fall, 3 credits

M. C. MERRILL and SPECIALISTS

Limited to 40 students.

Intended primarily for those seeking information on editorial techniques involved in handling manuscripts after they leave the author's hands and until they are issued in printed form. Discussion of the fundamental principles of editing, including the organization or rearrangement of material for effective presentation; rhetorical style in relation to subject matter; word forms, sentence structure and effective use of English; the Style Manual of the Government Printing Office; considerations governing titles, tables of contents, headings, footnotes, illustrations, literature citations and bibliographies, and statistical checking; the principles of table formation and arrangement; the relation of type to subject matter and the techniques of printing; and the fundamentals of indexing and proofreading. Opportunity is afforded to apply these principles in practical work in editing, which is then discussed in class. A trip to the Government Printing Office is arranged to note and study operations there.

360. Advanced Practice in Editing

Spring, 2 credits

CHARLOTTE L. WHITE

Advanced instruction in literary and statistical editing and the preparation of tables. The class will work on editorial material provided by the instructor or submitted by the students. *Prerequisite:* Principles of Editing and Their Application or consent of the instructor.

224. Creative Writing

Fall, 2 credits. Repeated in Spring and Summer DELIGHT WILLIAMSON HOLT

The purpose of this course is to acquaint the student with the basic problems of structure and style in the fields of fiction, verse, and drama. The material of the course is slanted toward the creative approach altogether rather than toward the journalistic. Work of the course will be divided between lectures on technique and discussion of the work of class members. Emphasis within the

various creative fields will be determined by the expressed interests of the class, but every effort will be made to present an integrated view of the whole scope of creative writing—not only from an aesthetic but also from a practical technical standpoint. Problems of marketing and selling also will be considered. Thus, students will be equipped to understand their profession as a whole, as well as the chosen phase of it which constitutes their field of special interest. The course will prove a quick, up-to-the-minute brush-up for those who have done some writing, whether for pleasure only or for publication, and who feel the need of refreshing themselves on fundamentals before resuming their creative activities. *Prerequisite:* English Composition or equivalent or permission of the instructor.

410. Creative Writing Workshop

Spring, 2 credits

DELIGHT WILLIAMSON HOLT

This course will consist entirely of open forum discussion of the work of class members. Students will work on projects of their own choosing in any phase of creative writing in which they are interested. *Prerequisite:* Creative Writing or equivalent or permission of the instructor.

226. Introduction to Official Writing

Fall, 2 credits

J. KENDALL McCCLAREN and MARGUERITE GILSTRAP

This course covers the principles of clear statement that must be applied to all forms of writing. Emphasis is given to the special requirements of official writing within the boundaries of economic and scientific research, government organization, and official policy. Frequently these limitations lead to a style that is wordy and lifeless. The course, which presupposes some writing experience, considers ways of making official writing clear, vigorous, and readable in spite of the necessary rules and restrictions. One major writing project is required.

250. Interpretive Writing on Official Action

Spring, 2 credits

J. KENDALL McCCLAREN and MARGUERITE GILSTRAP

This course presents informally the elements of explaining official activities through newspaper releases, magazine articles, printed reports, radio scripts, and other public media. The workshop method is followed so far as practical with practice in the preparation of background and interpretive material on government research, programs, and policies. *Prerequisite:* Introduction to Official Writing or equivalent.

200. Readable Writing

Spring, 2 credits

AMY G. COWING and HARRY MILEHAM

There is increased interest in writing material so that people will find it appealing and easy to read, because much writing is, and has been, too hard for most people to read.

This course will teach you how to write so that more people will read and understand your articles and bulletins; how to estimate how easy or hard the reader will find your writing; how to organize your writing for easy reading. It will also deal briefly with the use of pictures and other visual aids to reading. Much of the course will center around use of the Flesch Readability Formula and will consist of lectures and workshop sessions in which students will make practical application of writing principles.

120. Indexing

Fall, 1 credit

MABEL H. DOYLE

This course is intended primarily for those interested in making indexes for periodicals, bulletins, reports, and books. Emphasis will be placed on general procedures and matters of policy as well as on basic principles and techniques.

Specific types of indexing adapted to various subjects and popular style, contrasted with technical and scientific styles, will be studied. Examples of different kinds of indexes will be shown and opportunity given for practical work in the preparation of indexes, including the making of cross references, alphabetizing, and editorial preparation of index cards and manuscripts for the printer.

237. Government Printing Procedure

Spring, 2 credits

LOUIS H. ANDERSON

Intended for those who plan, prepare, or procure printing, duplicating, and distribution of books, pamphlets, folders, posters, charts, forms and other printed or duplicated matter. Subjects covered include: analysis of manuscript copy and its purpose to determine format and method of production; organization of copy for effectiveness; copy fitting and measuring; ways to aid the reader to grasp the message of the printed word; legibility and readability; type faces and typography; illustrations; printing and duplicating processes and criteria for their use; paper; binding methods; preparation of copy for duplicator and printer; handling of proofs; specifications and cost factors; and channels and methods of distribution of Government publications. The knowledge of methods and procedures to be acquired from this course is intended to give the student competence and confidence in dealing with author and editor, and printing, duplicating and distribution technicians.

43. Personal Development

Fall, non-credit. Repeated in Spring

HESTER H. GALVIN and HESTER B. PROVENSEN

Discovery and development of potentialities of each student. Poise, confidence, appearance, make-up, dress and color sense, art of conversation, and cultivation of wider range of interest and curiosity. Actual social situations created and discussed. Conferences, guest speakers.

70. Introduction to Library Service

Fall, non-credit

(To be announced)

Designed to provide a background of information and training for the sub-professional assistant by introducing him to the general organization of the library, its resources and services. The course is aimed at providing the student with a clear understanding of the functions of the library; at training him in the efficient use of basic library material and tools, such as the card catalog and general reference books; and at acquainting him with the place of the sub-professional assistant in the general organization of library service.

71. Introduction to Library Techniques

Spring, non-credit

(To be announced)

Designed to instruct the sub-professional library assistant in the technical operations in general usage at this operative level. Includes such techniques as: circulation methods and procedures, book purchasing routine and records, simple processing and preparation of materials, filing, inter-library loan service, etc.

FOREIGN LANGUAGES

Events of World War II and the unprecedented expansion of all kinds of international activities have greatly increased interest in the study of foreign languages. Research workers, those employed in all aspects of international relations, and those scheduled for foreign assignments are in need of foreign-language instruction. With the expansion of international land, water and air transporta-

tion many persons find it desirable to improve their facility of speech in some foreign language before visiting our world neighbors.

The Graduate School provides opportunities for instruction in a wide range of foreign languages. The person who is seeking the maximum practical value from a foreign language must learn not only to translate it but to think in it well enough for translation to be unnecessary. It is the aim of those responsible for these courses to conduct them so as to develop in their students a ready and intelligent use of the language.

INTENSIVE LANGUAGE INSTRUCTION

The Department of State is authorized to provide language training, through the Foreign Service Institute, for Federal employees who are certified by their agencies as requiring language training to perform necessary duties in connection with definite foreign assignments. Upon written certification by the agency, official arrangements may be made to place such persons in one of the regular intensive language classes offered by the Foreign Service Institute, depending upon the availability of facilities. Such training will be given on official time at no cost to the student. Department of Agriculture employees may secure information about this program from the Registrar. Persons from other Departments may secure information from the Registrar or directly from Dr. Henry Lee Smith, Jr., Foreign Service Institute, Department of State, Ext. 3260.

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DIRECTED LANGUAGE STUDY

In some languages and in specialized scientific fields, enrollment is insufficient to justify offering instruction on a regular basis. If fifteen or more students inform the Graduate School office of their wish to take advanced work in a language, a class may be organized in which students will proceed with their study on an individual basis under the instruction of a teacher who will guide their study.

ARABIC, CHINESE, CZECH, DUTCH, GREEK, HINDU, JAPANESE,
MALAY, POLISH

Groups of students desiring instruction in any one of these languages are requested to notify the Graduate School of their interest. If a sufficient number are interested, an instructor will be secured and all necessary arrangements made to offer the course.

Unless otherwise specified, all foreign language courses are organized as follows:

Elementary year—foundation work in grammar, vocabulary, reading, and translation, with some conversation.

Intermediate year—grammar review, more difficult reading and translation, use of idioms, writing and discussion in the language.

Conversation—development of facility in discussion and reading, use of idioms, writing and thinking in the language without translating.

Note: Course numbers followed by (a) are first-half of that course, or by (b) are second-half.

FRENCH

253^a. Elementary French

Fall, 3 credits. Repeated in Spring

JOHN DE NOIA
ANTOINE BERVIN

253^b. Elementary French

Spring, 3 credits. Repeated in Summer

JOHN DE NOIA
ANTOINE BERVIN

254^a. Intermediate French

Fall, 3 credits

LEONORA C. ROSENFIELD

254^b. Intermediate French

Spring, 3 credits

LEONORA C. ROSENFIELD

255^a. French Conversation

Fall, 2 credits

HENRI DE MARNE

255^b. French Conversation

Spring, 2 credits

HENRI DE MARNE

48. Elementary Scientific French

Spring, non-credit

LUC SECRETON

GERMAN

259^a. Elementary German

Fall, 3 credits. Repeated in Spring and Summer

MARIANNE LEDERER
MAX LEDERER

259^b. Elementary German

Fall, 3 credits. Repeated in Spring and Summer

MARIANNE LEDERER
MAX LEDERER
CHARLY R. OCHSNER

260^a. Intermediate German

Fall, 3 credits

JOSEPH PONTI

260^b. Intermediate German

Spring, 3 credits

JOSEPH PONTI

261^a. German Conversation

Fall, 2 credits

MAGNA E. BAUER

261^b. German Conversation

Spring, 2 credits

MAGNA E. BAUER

60. Elementary Scientific German

Spring, non-credit

MARIANNE LEDERER

ITALIAN**270^a. Elementary Italian**

Fall, 3 credits

JOHN ROSSETTI

270^b. Elementary Italian

Spring, 3 credits

JOHN ROSSETTI

[271.] Intermediate Italian

JOHN ROSSETTI

PORTUGUESE**290^a. Elementary Portuguese**

Fall, 3 credits

LEONOR DE M. STEWART

290^b. Elementary Portuguese

Spring, 3 credits

LEONOR DE M. STEWART

RUSSIAN**295^a. Elementary Russian**

Fall, 3 credits. Repeated in Spring and Summer

PETER P. LAPIKEN
ERIC T. SCHULER
EUGENIA TARAKUS**295^b. Elementary Russian**

Fall, 3 credits. Repeated in Spring and Summer

PETER P. LAPIKEN
ERIC T. SCHULER
EUGENIA TARAKUS**296^a. Intermediate Russian**

Fall, 3 credits

GEORGE M. SAHAROV

296^b. Intermediate Russian

Spring, 3 credits

GEORGE M. SAHAROV

299^a. Advanced Russian

Fall, 3 credits

GEORGE M. SAHAROV

299^b. Advanced Russian

Spring, 3 credits

GEORGE M. SAHAROV

[297.] Russian Conversation

GEORGE M. SAHAROV

46. Everyday Russian

Summer, non-credit

GEORGE M. SAHAROV

Accuracy and facility in the use of oral Russian will be attempted through use of dictation, conversation, and other devices. The work will be adapted to those entering the course. The course is designed especially for those who wish to acquire fluency in the spoken language of today. *Prerequisite:* One year of Russian.

49. Elementary Scientific Russian

Fall, non-credit

ANTOINETTE PINGELL

70. Intermediate Scientific Russian

Spring, non-credit

ANTOINETTE PINGELL

SPANISH**300^a. Elementary Spanish**

Fall, 3 credits. Repeated in Spring and Summer

 CONSUELO BATISTA
 ERWIN JAFFE
 JOSE GARCIA-TUNON
 EUGENE YSITA
300^b. Elementary Spanish

Fall, 3 credits. Repeated in Spring and Summer

 CONSUELO BATISTA
 ERWIN JAFFE
 JOSE GARCIA-TUNON
 EUGENE YSITA
301^a. Intermediate Spanish

Fall, 3 credits

ARTHUR C. PARSONS

301^b. Intermediate Spanish

Spring, 3 credits

ARTHUR C. PARSONS

302^a. Spanish Conversation and Literature

Fall, 2 credits

RAFAEL SUPERVIA

302^b. Spanish Conversation and Literature

Spring, 2 credits

RAFAEL SUPERVIA

574^a. Advanced Spanish Conversation

Fall, 2 credits

G. MEDRANO DE SUPERVIA

Limited to students with four years of Spanish, including a course in conversation or its equivalent.

574^b. Advanced Spanish Conversation

Spring, 2 credits

G. MEDRANO DE SUPERVIA

47. Everyday Spanish

Summer, non-credit

RAFAEL SUPERVIA

Accuracy and facility in the use of oral Spanish will be attempted through the use of dictation, conversation, and other devices. The work will be adapted to those entering the course. The course is designed especially for those who wish to acquire fluency in the spoken language of today. *Prerequisite:* One year of Spanish.

Department of Mathematics and Statistics

DEPARTMENTAL COMMITTEE

W. EDWARDS DEMING, Ph.D., Adviser in Sampling, Bureau of the Budget (Chairman)

ALVA E. BRANDT, Ph.D., Statistical Consultant to Technical Director, Naval Ordnance Laboratory, Department of the Navy

JOHN H. CURTISS, Ph.D., Chief, National Applied Mathematics Laboratories, National Bureau of Standards, Department of Commerce

JOSEPH F. DALY, Ph.D., Statistician, Bureau of the Census, Department of Commerce
HAROLD F. DORN, Ph.D., Chief, Office of Statistical Methods and Services, Division of Public Health Methods, U. S. Public Health Service, Federal Security Agency

MORRIS H. HANSEN, M.A., Statistical Assistant to the Director, Bureau of the Census, Department of Commerce

B. R. STAUBER, M.A., Chief, Division of Agricultural Price Statistics, Bureau of Agricultural Economics, USDA (Vice-chairman)

O. C. STINE, Ph.D., Assistant Chief for Prices and Marketing, Bureau of Agricultural Economics, USDA

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THE STATISTICIAN AND HIS EDUCATION

Unprecedented dependence is being placed on statisticians by administrative officials in government and private business all over the world. There is an increasing appreciation of the importance and the possibility of possessing information of measurable reliability as a basis for making decisions. The statistician, through his specialized training, is able to provide current and comprehensive information on many subjects, and to do so with speed and economy.

Competent statisticians are accordingly in great demand, in government, business, and for teaching positions in the universities; the demand will exceed the anticipated supply for many years. The making of a statistician is a long and exacting process—several years of graduate study, plus at least a year and a half of high-grade experience under competent leadership. Educational facilities are strained, not only because of the heavy and increasing demand but also because the educational requirements placed on the statistician today are of an entirely different order of magnitude than they were a few years ago.

The opportunities offered in Washington for statistical education are unsurpassed, particularly with regard to work-experience and theory of modern sample-design. The advanced courses offered by the Graduate School are intended to supplement the statistical studies obtainable in universities. Further supplementation is provided through the internship plan (see page 36), by which practical experience in all aspects of sampling can be gained along with theory.

Statistical training is recognized as a necessary adjunct in such fields as engineering, biology, agricultural science, business, sociol-

ogy, economics, public opinion, and other branches of the natural and social sciences. Training in these professions is now regarded as incomplete without mathematical and statistical studies, through intermediate grades at least. Courses are offered by the Graduate School to provide this kind of training.

The statistician is particularly equipped by training and experience to assist in the formulation of scientific courses of action in government, manufacturing, and distribution. He must know when data are needed and how much precision is required, and what the cost should be. He is expected to be expert in the collection, analysis, interpretation, and presentation of quantitative information. He may be called upon to administer a statistical organization. He must therefore be familiar with problems of classification and definition. He is expected to be expert in the design of questionnaires and sampling procedures, and must therefore know field-work and costs. The courses described on the following pages accordingly provide training not only in theoretical principles, but training also in the administrative and research uses of data, as well as in the collection and processing of data and in the development and supervision of the minor skills necessary for carrying out statistical work.

In the design of a survey the statistician is concerned with the reliability and the cost of the figures that are to be obtained. Reliability is affected by many sources of error, which can be classified under two groups: (a) biases that are common to both complete counts and samples; (b) sampling errors. A thorough understanding of both types of error is essential in the work of the statistician. The statistical courses listed on the following pages deal mainly but not entirely with sampling errors. Proficiency in one or another branch of subject-matter such as sociology, economics, agricultural science, engineering, or some other specialized field, is essential for a full appreciation of the first type of error and for that reason collateral studies in one or more fields of science are advised and in fact are insisted upon in work leading to a Certified Statement of Accomplishment in Statistics.

OUTSIDE LECTURERS

The Graduate School has made a practice of bringing one or two outside leaders in statistical thinking to Washington annually. In the past, the following eminent authorities have lectured here: R. A. Fisher, John Wishart, Walter A. Shewhart, J. Neyman, Frank Yates, Harold Hotelling, Harold Jeffreys, P. C. Mahalanobis, and L. H. C. Tippett. Some of these lectures are available in print; see the list of publications on the back cover.

CERTIFIED STATEMENT OF ACCOMPLISHMENT IN STATISTICS

A Certified Statement of Accomplishment is offered in each of three fields of statistical study—fields representing areas of statistical preparation and application most useful in the public service. The required program in each field is outlined on page 37. The student who completes the basic courses and earns 24 credits in specialized courses listed in any column, with substitutions only as specifically approved, is eligible to receive a Certified Statement of Accomplishment. It certifies that the student has completed a program of study which, in conjunction with collateral training in a subject-matter field of application, prepares him for effective public service in a particular statistical field.

INTERNSHIPS IN SAMPLING

In recognition of the shortage of statisticians with thorough theoretical training and with experience in large-scale statistical projects under competent leadership, and in recognition of the exceptional facilities in Washington for specialized training in this field, the Graduate School has undertaken to present to qualified students the opportunity to pursue their studies under a system of internships. Under this program a limited number of people with the necessary background will have a unique opportunity to combine advanced study with practical experience in sampling. Advanced candidates (Groups a and b below) will undertake a program of approximately a year and a half in duration, consisting in part of theoretical training and in part of work-experience. Candidates in Group c will require a longer period. The program will be planned on an individual basis, depending upon the work, training, and interests of the candidate. These internships carry no stipends.

The internships are intended to supplement, not supplant, work offered in universities. The program provides splendid opportunity for graduate students to do research work under leading authorities. The internships are open to three groups:

- a. those who have received their doctorates in mathematical statistics or have completed most of the courses necessary therefor;
- b. those who have received their doctorates or have completed most of the work necessary therefor in some sister profession such as agricultural science, economics, sociology, social psychology, engineering, etc.;
- c. those who cannot meet the above requirements and who must acquire a large part of their classroom training while engaged on the internship program.

COURSES LEADING TO CERTIFIED STATEMENTS OF ACCOMPLISHMENT IN STATISTICS

With Concentration in One of the Following Fields of Application

THE SOCIAL SCIENCES

BASIC COURSES—Required of all candidates

College Algebra, Plane Trigonometry and Analytic Geometry	College Algebra, Plane Trigonometry and Analytic Geometry	College Algebra, Plane Trigonometry and Analytic Geometry
Principles of Statistical Analysis	Principles of Statistical Analysis	Calculus

SPECIALIZED COURSES

206. Calculus	206. Calculus	400. Introduction to Mathematical Statistics	400. Introduction to Mathematical Statistics
400. Introduction to Mathematical Statistics	400. Introduction to Mathematical Statistics	500. Advanced Calculus	500. Advanced Calculus
520. Statistics of the Federal Government	704. Interpolation, Approximation, and Mechanical Quadrature	708. Linear Algebra	708. Linear Algebra
727. Planning of Statistical Surveys	723. Design and Analysis of Complex Experiments	712. Theory of Functions	712. Theory of Functions
735. Theory of Sample Surveys	731. Least Squares and Curve Fitting	723. Design and Analysis of Complex Experiments	723. Design and Analysis of Complex Experiments
734. Statistical Methods for Research Workers or Workers	734. Statistical Methods for Research Workers	727. Planning of Statistical Surveys	727. Planning of Statistical Surveys
738. Introduction to Sampling and Statistical Inference	738. Introduction to Sampling and Statistical Inference	735. Theory of Sample Surveys	735. Theory of Sample Surveys
753. Recent Developments in Statistical Concepts	749. Control of Quality by Statistical Methods	739. Multivariate Analysis	739. Multivariate Analysis
		740. Advanced Analysis of Variance	740. Advanced Analysis of Variance
		741. Theory and Application of the Characteristic Function	741. Theory and Application of the Characteristic Function
		751. Theory of Measure	751. Theory of Measure
		752. Advanced Theory of Probability	752. Advanced Theory of Probability

ELECTIVE COURSES

500. Advanced Calculus	709. Theory of Infinite Processes
502. Differential Equations	732. Sampling in Social and Economic Surveys
704. Interpolation, Approximation, and Mechanical Quadrature	741. Theory and Application of the Characteristic Function
712. Theory of Functions	752. Advanced Theory of Probability

The internship will consist of two integrated parts:

1. Classroom training in courses at the Graduate School, or at other educational institutions in the city. This training will be planned to strengthen previous training and to fill gaps.
2. Work experience in government agencies on large-scale statistical sampling and testing programs. The work in the social sciences will consist of assistance in the preparation of questionnaires and sampling plans; development, application, and testing of new theory; writing instructions for use in the field, in the office, and for tabulation; computation of sampling errors; computation of costs; and actual experience in interviewing. Every intern and his program must be approved by the agency to which he is assigned.

Included among the agencies to which interns will be assigned are:

Bureau of Agricultural Economics
Bureau of the Budget

Bureau of the Census
Bureau of Labor Statistics
National Bureau of Standards

Opportunity will be given for actual field experience. Holders of internships in industrial statistics will take part in the development of the necessary statistical theory and in experimental design, and will have the opportunity of becoming familiar with actual testing practice and the development of new methods.

This program is under the immediate direction of a Committee on Internships in Sampling. The committee is composed of:

W. EDWARDS DEMING (Chairman)
W. F. CALLANDER, Assistant Chief for Agricultural Estimates, Bureau of Agricultural Economics, USDA
WILLIAM G. COCHRAN, Professor of Statistics, Institute of Statistics, University of North Carolina

MORRIS H. HANSEN
ARYNESS JOY WICKENS, Assistant Commissioner, Bureau of Labor Statistics, Department of Labor
FREDERICK F. STEPHAN, Professor of Sociology and Statistics, Cornell University

Each application will be reviewed and approved or rejected by this Committee. The Committee will help the intern plan his program and will consult with him from time to time concerning his progress. The Committee will keep the university informed of progress, where the intern program is being developed as a research project.

Upon satisfactory completion of the internship the individual will be awarded by the Graduate School a certified statement appropriately descriptive of the nature, extent, and quality of the

training and work experience. In the case of pre-doctorate candidates credit will be transferable under arrangements worked out in advance with the institution in which the intern is a candidate for a degree. In certain cases this work may be used, with the approval and cooperation of the degree-granting institution, as the doctoral thesis or as the basis for it.

Applications should be made to the Director of the Graduate School and should include the following information:

- | | |
|---|---|
| (1) Name | (5) Fields of specific interest and circumstances surrounding application (i.e., purpose, whether applicant would devote full time to internship, etc.) |
| (2) Date and place of birth | |
| (3) Previous academic work | |
| (4) Citations or copies of publications or technical papers | |

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Course Numbers and Symbols—Below 100, non-credit; 100–399, undergraduate; 400–699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

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MATHEMATICS

1. Review of Freshman Mathematics

Fall, non-credit. Repeated in Summer

ROBERT H. HANSON

A review course on the level of freshman mathematics. Algebra, trigonometry, analytic geometry. A brief introduction to the methods of the differential calculus. Emphasis on applications to statistical problems. *Prerequisite:* One year of college mathematics.

2. Review of Calculus

Fall, non-credit. Repeated in Summer

H. BURKE HORTON

Variables, functions, limits, divided differences, derivatives, application of derivatives to geometry, engineering curve fitting and analysis. Transcendental functions, polar equations, differentials, mean value theorem, techniques of integration and engineering application. Series and expansion of functions. *Prerequisite:* Calculus.

102. Algebra

Fall, 3 credits. Repeated in Summer

GEORGE B. GIBSON
JOSEPH S. RHODES
ROBERT G. WILLIAMSON

Fundamental rules of algebra; exponents; logarithms; manipulations with proportions; identities and conditions; solution of equations; binomial theorem; numerical approximations. Uses of symbolic operators. Determinants; solution of equations by the reciprocal matrix. Theory of equations; progression; series. Permutations and combinations. Graphical methods. Emphasis on applications to statistics and the physical sciences. *Prerequisite:* High school algebra and plane and solid geometry.

104. Trigonometry

Fall, 2 credits. Repeated in Spring

HARLAN ROSENBLATT
JOSEPH S. RHODES

Basic definitions and uses of trigonometric functions; logarithmic solutions; radian measure; fundamental identities; oblique triangles; polar coordinates, inverse trigonometric functions; complex numbers and De Moivre's theorem; graphs of the functions and the inverse functions; introduction to spherical trigonometry. *Prerequisite:* College algebra.

105. Analytic Geometry

Spring, 4 credits

HARLAN ROSENBLATT

Planned for students majoring in engineering. Coordinates, locus problems, the straight line and circle, graphs, transformation of coordinates, conic sections, parametric equations, solid analytic geometry, curve fitting. *Prerequisite:* College algebra and plane trigonometry.

106. Analytic Geometry

Spring, 2 credits

JOSEPH S. RHODES

Fundamental concepts and formulas; line, circle, parabola, ellipse, hyperbola; transformation of coordinates; polar coordinates; parametric equations; the second and higher degree equation in rectangular coordinates; graphic solution of equations; introduction to solid analytic geometry. *Prerequisite:* Trigonometry and college algebra.

206. Calculus

Year, 4 credits each semester

THOMAS N. E. GREVILLE
JOHN E. JACKSON

First semester. Variables, functions, limits, continuity, divided differences, derivatives. Application of the derivative to geometry, physics, curve fitting, and analysis. Mean value theorem. The anti-derivative. Riemann integration. *Prerequisite:* Algebra and trigonometry and analytic geometry.

Second semester. Standard integral forms. Partial and total derivatives. Constrained maxima and minima in two variables; Lagrange multipliers. Interpolation. Taylor's series with one, two, and three variables. Propagation of errors. Series. Multiple integrals. Line integrals. Approximate integration; the Euler-Maclaurin formula for integration and summation. History and application stressed. *Prerequisite:* First semester or equivalent.

307. Survey of College Mathematics

Spring, 3 credits

MURRAY A. GEISLER

A course covering the ideas and methods of modern mathematics, designed for students who wish to unify their mathematical training. Subjects treated consist of the theory of numbers, the number system, geometrical constructions, projective geometry, topology, functions, and limits. Emphasis will be placed upon the content and purpose of mathematical learning by appropriate illustrations from various fields. Text: Courant and Robbins, *What is Mathematics?* (Oxford, 1941). *Prerequisite:* Calculus, or consent of the instructor.

500. Advanced Calculus

Year, 2 credits each semester

MARTIN GREENSPAN

Review of fundamental theory of the calculus, Taylor's series and related subjects. Plane curves, envelopes, order of contact. Differentiation and integration of integrals; line, surface and volume integrals. Infinite and improper integrals. Some calculus of variations. Asymptotic series and approximations to definite integrals in functions with several variables. Function scales and relations between derivatives. Reduction of curves to linear relations. Surfaces, tangent planes, and normals. Some study in the complex variable. *Prerequisite:* Calculus.

502. Differential Equations

Fall, 3 credits

JOSEPH A. GREENWOOD

Will cover ordinary differential equations with applications to physics and engineering, symbolic operator and successive approximations. *Prerequisite:* Calculus.

700. Vector Analysis

Fall, 3 credits

FRED D. RIGBY

Development of the fundamentals of the algebra and calculus of vectors, for the treatment of statistical and engineering problems. Scalar and vector fields. Stokes', Gauss', and Greene's theorems. The hydrodynamical equations of continuity, Maxwell's hypotheses for free space. Applications of vector methods to topics of particular interest to members of the class is made as time permits. *Prerequisite:* Calculus, plus either a year of college physics or a year of statistics.

704. Interpolation, Approximation, and Mechanical Quadrature

Year, 2 credits each semester (every third year) THOMAS N. E. GREVILLE

Interpolation. Forward and backward difference-formulas. Central difference formulas. Operational notation. Sheppard's zig-zag rule. Inverse interpolation. Aitken's iteration method. The throw-back. Double-entry interpolation. Osculatory interpolation. Construction of tables. Derivatives from differences; differences from derivatives. The Euler-Maclaurin sum. Some work in difference equations. Calculation of derivatives and integrals. Theorems of Weierstrass. Approximations of continuous functions by polynomials and trigonometric sums. Tchebycheff's "best" approximation. Remainder, convergence, and divergence of interpolation formulas. Quadrature; degree of approximation; convergence. Theorems of Legendre, Gauss, Bernstein, Poisson, Jackson, and Shohat. *Prerequisite:* Calculus; theory of functions advised.

[715.] Applications in Engineering Mathematics (1949-50 and every third year)

RICHARD K. COOK

706. Analytical Mechanics

Year, 2 credits each semester (every third year) RICHARD K. COOK

The elements of vector analysis. The fundamental principles of statics, kinematics, and dynamics. Lagrange's and Hamilton's generalized equations. Central forces; vibrations; wave motion; gyroscope; top. Potential theory. *Prerequisite:* Calculus, college physics, and elementary statics and dynamics.

[708.] Linear Algebra (1949-50 and alternate years)

DAVID BLACKWELL

Introduction to Mathematical Analysis (See p. 44)**Theory of Measure** (See p. 44)**[709.] Theory of Infinite Processes (1949-50 and every third year)****[712.] Theory of Functions (1950-51 and every third year)**

JOSEPH F. DALY

Some of the mathematical courses offered by the Educational Committee at the National Bureau of Standards may be of interest to prospective students, particularly as some of them are not obtainable elsewhere. Persons outside the National Bureau of Standards wishing to enroll may secure additional information from the Registrar, Mrs. L. L. Chapin, at the National Bureau of Standards.

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STATISTICS

Elementary Courses

110. Graphic Methods of Presenting Statistics

Spring, 2 credits

R. G. HAINSWORTH and NELSON P. GUIDRY

Analysis of statistical data to determine what form is best for graphic presentation. Application of data to the many types of illustrations in several forms of the various classes. Rough pencil layout examples of time series charts, frequency diagrams, graphic correlation charts, pictorial symbol charts, cartograms and other illustrative examples will be prepared in class. *Prerequisite:* An introductory course in statistics, Elements of Statistical Drafting, or experience approved by the instructor.

126. Introductory Statistics

Year, 2 credits each semester

C. M. PURVES

The collection of economic and census data. The presentation of data in tables and charts. Different kinds of averages. Dispersion. Introduction to index numbers. Relations between two or more variables. Introduction to correlation theory, regression, and interpretation of samples. Practice in calculations. *Prerequisite:* High school algebra and geometry.

127^a. Principles of Statistical Analysis

Fall, 3 credits. Repeated in Spring and Summer

HAROLD NISSELSON
JOSEPH STEINBERG

The aim of courses 127a and 127b is to teach the methods of elementary statistical techniques and prepare students for advanced courses.

Elementary concepts of the statistical method; collection and uses of data; statistical terminology. Some general distribution theory. Elementary principles of design and analysis of surveys and experiments. Statistical control of quality. Distinction between enumerative and analytic problems. Acceptance sampling in industry. *Prerequisite:* College algebra, plane trigonometry and analytic geometry.

127^b. Principles of Statistical Analysis

Spring, 3 credits. Repeated in Summer

HAROLD NISSELSON
JOSEPH STEINBERG

Continuation of 127a. Regression and curve fitting. Statistical significance. Statistical tests as a basis for action. Introduction to the analysis of variance. Use of statistical tables, such as Fisher, Yates, and others. *Prerequisite:* 127a.

318. Machine Tabulation

Fall, 2 credits. Repeated in Spring

MILTON KAUFMAN

The punch-card method. Functions of the principal types of tabulating machines. Operations of the machines are demonstrated. The instruction covers basic wiring of all types of commercial tabulating equipment. *Prerequisite:* General knowledge of tabulating equipment.

319. Advanced Application of Tabulating Equipment

Spring, 2 credits

MILTON KAUFMAN

The solution of advanced problems in the application of card-tabulating equipment, including the wiring of principal machines involved. *Prerequisite:* A course in machine tabulation and knowledge of the basic wiring of tabulating equipment.

*Advanced Courses***400. Introduction to Mathematical Statistics**

Year, 3 credits each semester

BENJAMIN J. TEPPING

A foundation course designed to give the student a broad introduction to modern mathematical statistics, after which he may specialize in application and do further work in mathematical statistics either for an advanced degree or a certified statement of accomplishment. General properties of sampling-distributions, with special studies of the binomial, hypergeometric, Poisson, multinomial, and normal distributions. Joint distributions of several variables. Moment generating functions. Distributions of chi-square, Student's t, Fisher's z, Snedecor's F, and the sample range. Distribution-free methods. Tests of statistical hypotheses. Estimation; bias, consistency, efficiency. Discriminant functions. Design of samples and experiments. *Prerequisite:* Calculus and Principles of Statistical Analysis or equivalent.

[738.] Introduction to Sampling and Statistical Inference
(1949-50 and alternate years)

W. EDWARDS DEMING

Prerequisite: Introduction to Mathematical Statistics or equivalent.

[741.] Theory and Application of the Characteristic Function
(1949-50 and every third year)

WALTER JACOBS

Prerequisite: Introduction to Mathematical Statistics or equivalent and Advanced Calculus or Theory of Functions.

735. Theory of Sample Surveys

Year, 2 credits each semester MORRIS H. HANSEN and WILLIAM N. HURWITZ

History of sampling in social surveys. The use of statistical control in improving the quality and efficiency of the estimates. Calculation of sampling errors. Random, stratified random, purposive, double and systematic sampling. Cost function, choice of sampling unit; size and type of sample necessary to attain a stated degree of precision, and the distinction between precision and accuracy. The theory of probability is developed as necessary. The contributions of Fisher, Neyman, Yates, Cochran, and others are studied. *Prerequisite:* Principles of Statistical Analysis and Calculus.

[731.] Least Squares and Curve Fitting (1950-51 and every third year)

W. EDWARDS DEMING

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The following three courses form a two-year cycle.

[708.] Linear Algebra (1949-50 and alternate years)

DAVID BLACKWELL

Prerequisite: Calculus.

739. Multivariate Analysis

Year, 3 credits each semester (alternate years)

DAVID BLACKWELL

Multivariate normal distribution; joint moments of sample variances, and covariances. Sampling from a bivariate normal population. Tests of significance; problems of estimation. Joint distribution of variance and covariance; distribution of the correlation coefficient when the population correlation is and is not zero. Least squares; classical applications; relation to maximum likelihood. Distribution of the multiple correlation coefficient. Orthogonal polynomials. Factor analysis. Canonical correlation. Non-normal distributions. Applications. *Prerequisite:* Linear Algebra; work in intermediate or higher statistics.

[740.] Advanced Analysis of Variance (1949-50 and alternate years)

DAVID BLACKWELL

Prerequisite: Multivariate Analysis.

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The following four courses form a three-year cycle.

430. Introduction to Mathematical Analysis

Fall, 3 credits (every third year)

JOSEPH F. DALY

This course is intended to bring the student into contact with the modern concepts and techniques used in the theory of probability and the theory of the integral, as exemplified in the work of Cramer, Frechet, Kolmogoroff, and Saks. Attention will be concentrated on the basic properties of the real number system, elementary operations with point sets, and applications of the idea of topological space to a general treatment of functions, limits, and continuity. The theorems developed will be essentially those invoked in the standard course in advanced calculus. *Prerequisite:* Calculus.

751. Theory of Measure

Spring, 3 credits (every third year)

JOSEPH F. DALY

Review of theory of function of a real variable. Point set theory. Riemann integration, Lebesgue measure. Lebesgue and Stieljes integrals. Applications to the theory of probability. *Prerequisite:* Introduction to Mathematical Analysis.

[752.] Advanced Theory of Probability (1949-50 and every third year)

JOSEPH F. DALY

[551.] Sequential Analysis of Statistical Data (1950-51 and every third year)

JOSEPH F. DALY and DAVID BLACKWELL

Prerequisite: Theory of Measure and Advanced Theory of Probability.*Non-mathematical Courses***560. Theory of Electronic Digital Computing Machines**

Fall, 2 credits

EDWARD W. CANNON

Mathematical requirements for electronic digital computers. Alternative methods of sequencing automatic computers—instruction codes. Electronic com-

puter systems and components—internal memory, control, arithmetic unit, input-output devices. Performance characteristics of electronic computers; analysis of errors. Preparation of problems for machine solution. *Prerequisite:* A bachelor's degree with major in engineering, mathematics, statistics, or physics and Principles of Statistical Analysis or equivalent.

530. Seminar on Economic Models

Fall, 2 credits

Arranged by EMIL SCHELL

A series of lectures on selected economic models which can be mathematically formulated and which can be applied to real situations. Special emphasis will be placed upon the input and output techniques used by Leontief in studies of inter-industry relations and upon new extensions of the method. The course will be of particular interest to economists and statisticians engaged in programs of computation or analysis. A knowledge of the methods of handling linear equations will be helpful but may be obtained by outside reading while the course is in progress. A full list of the topics and lecturers may be had in September. *Prerequisite:* A degree in one of the sciences and Principles of Statistical Analysis or equivalent.

410. Agricultural Estimating Procedures

Year, 2 credits each semester (alternate years)

WALTER A. HENDRICKS

Simple and multiple regression methods, orthogonal functions and their relation to graphic correlation methods, selection of expansion factors and their relation to sampling errors of estimates and correction for biases in mailed returns. Principles of sample design, sampling with unequal and equal probabilities of selection of sampling units, use of cost functions in sample allocation, adjustments for nonresponse in mailed surveys. Integration of mail and enumerative surveys. The theory will be applied specifically to the work of agricultural estimates. Numerical examples. *Prerequisite:* Bachelor's degree with major work in agriculture or one of the sciences, 6 semester hours of statistics or equivalent, and two years' experience in statistics.

[723.] Design and Analysis of Complex Experiments (1949–50 and alternate years)

A. E. BRANDT

727. The Planning of Statistical Surveys

Year, 2 credits each semester (alternate years)

A. J. JAFFE

Administrative uses of statistical data. Special difficulties in the collection of information on employment, unemployment, payrolls, costs, prices, consumption, opinions and attitudes. Statement of purpose of a survey; definition of the universe, with attention to special difficulties. Interviewing; construction of questionnaires. Complete and partial investigations; comparisons of biases in different kinds of partial investigations. Advantages and disadvantages of sampling. Computation of costs. Tabulation plans. Presentation of results for research purposes and for administrative use. *Prerequisite:* Principles of Statistical Analysis, statistical experience and academic work and practice in sociology or economics.

520. Statistics of the Federal Government

Year, 2 credits each semester (alternate years)

MORRIS B. ULLMAN

Designed to give acquaintance with the wealth of data available from Federal agencies. Attention will be paid to the methods used by different agencies for the collection of data; comparisons of biases, definitions, and basic concepts; different methods of presentation. *Prerequisite:* Statistical experience in industry or the Government service or permission of the instructor.

749. Control of Quality by Statistical Methods

Fall, 2 credits (alternate years)

WILLIAM R. PABST

Experiments in statistical variability. Chance causes and assignable causes. The Shewhart control chart. Distinctions between different kinds of charts; conditions under which each applies. Illustrations with data obtained from manufacturing. Reduced inspection. Impact of statistical methods on the writing of specifications. Quality determinations; acceptance-sampling. Advantages to purchaser and vendor through statistical methods of control and acceptance. *Prerequisite:* A first course in statistics and a college degree or equivalent in one of the sciences; statistical experience advised.

732. Sampling in Social and Economic Surveys

Fall, 3 credits (alternate years)

HAROLD NISSELMAN

Applications of the representative method to practical and timely problems. Fallacies of the total count. Accuracy and precision. Problems involved in the selection of a sample. The theory of random sampling. The choice of sampling unit. Subsampling, stratified sampling, purposive selection. The use of intra-class correlation and analysis of variance in the design of sampling techniques. Analysis of cost data. Review of important sampling procedures as used in the United States and foreign countries. *Prerequisite:* Principles of Statistical Analysis and experience in social surveys.

720. Evaluation of Errors in Surveys

Year, 2 credits each semester (alternate years)

GEORGE HAUSKNECHT

Errors arising from sources other than sampling. Problems of questionnaire construction, interviewing, and response. Psychophysical laws reviewed for structural problems. Scale analysis; tests of reliability and validity. *Prerequisite:* Elementary statistics; a degree in one of the sciences.

[734.] Statistical Methods for Research Workers

WALTER A. HENDRICKS

753. Recent Developments of Statistical Concepts

Fall, 1 credit

MORRIS B. ULLMAN and SPECIAL LECTURERS

A series of 10 lectures by leading government economists and statisticians. Discussion period following each lecture. Topics: National income, family budgets, housing and construction, labor force, agricultural estimates, foreign trade and shipping, transportation, manufacturing, the 1950 census of population, federal statistical organization, and other topics. *Prerequisite:* A degree in one of the sciences and Principles of Statistical Analysis or equivalent.

021. Seminars in Sampling and Statistical Inference

Year, non-credit

W. EDWARDS DEMING and H. BURKE HORTON

Annually the Department of Mathematics and Statistics conducts a series of six to eight lectures and discussions on sampling and statistical inference. These meetings, addressed by leading mathematical statisticians, are held primarily for advanced students in the Graduate School and others who are working in this field.

No fee is charged; registration, however, is required. Applications for new admissions to the seminar should be sent in writing to the Graduate School, with a statement regarding the applicant's education and experience. Notices regarding meetings are sent to those whose names are on the list.

Members of the Seminar will receive notices of meetings on statistical subjects in the Applied Mathematics Colloquium held at the National Bureau of Standards under the leadership of Dr. John H. Curtiss, Chief of the National Applied Mathematics Laboratories.

Department of Office Techniques and Operations

DEPARTMENTAL COMMITTEE

VIRGIL L. COUCH, B.S., Director of Personnel, Economic Cooperation Administration (Chairman)

HENRY A. DONOVAN, Assistant Chief, Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, USDA (Vice-chairman)

STROTHER B. HERRELL, Assistant Director, Office of Personnel, USDA

A. REX JOHNSON, Ph.D., Assistant Director, Office of Foreign Agricultural Relations, USDA

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JOHN S. LUCAS, Chief, Communications Division, Office of Plant and Operations, USDA

WILLIAM L. MOORE, A.B., Chief, Personnel Division, Farm Credit Administration, USDA

PAUL R. PRESTON, Ph.D., Assistant Chief, Administrative Services Division, Budget and Management Branch, Production and Marketing Administration, USDA

ARTHUR B. THATCHER, Chief, Office of Plant and Operations, USDA

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CLERICAL-ADMINISTRATIVE PROCEDURES

The courses described under Clerical-Administrative Procedures are closely related to those offered in the Department of Public Administration and are an integral part of the program leading to the Certified Statement of Accomplishment in Administrative Procedures. They are practical, how-to-do-it, courses chiefly of interest to persons in grade CAF-7 positions, or below, who are either working with these procedures, or who hope to train themselves for such positions, or positions requiring some familiarity with more than one of these procedural subjects (e.g., administrative assistants and head clerks). High school graduation is a basic requirement for admission to these courses; exception will be made only on the basis of proven equivalent experience.

CERTIFIED STATEMENT OF ACCOMPLISHMENT IN ADMINISTRATIVE PROCEDURES

The program leading to a Certified Statement of Accomplishment in Administrative Procedures should be of special interest to:

1. Persons already employed in administrative work of the procedural type, emphasizing techniques and skills.
2. Employees who aspire to enter administrative work but who, because of lack of college education, find their opportunities in that field greatly limited except at the procedural level. This program of courses is useful for persons with good native ability but limited educational background, because it prepares them for a level of work most likely to be open to them. After they have succeeded in getting into administrative work, perhaps even at the clerical-administrative level, they can then combine their work-experience and study-experience to mutual advantage as progress is made toward greater responsibility. This approach is believed to be better for such

persons than the common practice of attempting to circumvent the usual educational requirements by shortcut concentration on advanced and specialized courses, which are actually preparatory for responsible positions only insofar as they *supplement* broader educational background.

3. Employees who wish to prepare to become administrative assistants or to head units concerned with administrative procedures.

Approach

Emphasis on techniques, procedures, methods, but with an attempt to understand and use these means in terms of administrative ends or objectives.

Objectives

Ultimately, for responsible conduct of important "housekeeping" operations of specialized character, direction of small units, performance of most difficult and responsible tasks in the procedural aspects of administration, and the settlement of questions of intermediate importance arising out of current or contemplated operations and not covered by existing regulations or decisions.

Immediately, for effective service in some administrative procedure at the clerical or semi-clerical level, as a means of entrance into the line of promotion leading to the responsibilities named above. (Students already at this level may arrange programs in conformity with their needs.)

Requirements

1. High-school diploma or equivalent.
2. Sixteen semester hours of credit selected from the following Graduate School courses:
 - a. A minimum of eight credits must be selected from courses offered in the Department of Public Administration (excluding all accounting courses except Federal Government Accounting).
 - b. For the remaining eight credits the student may select from the following in the Department of Office Techniques and Operations:
 1. From all courses offered in the field of Clerical-Administrative Procedures.
 2. Government Letter Writing or Writing Procedures and Instructions.
 - c. A course in elementary statistics (not exceeding three credits) may be included. It is not required. If it is included, three credits may be deducted from b above.

Course Numbers and Symbols—Below 100, non-credit; 100-399, undergraduate; 400-699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

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108. Administrative Procedure

Fall, 2 credits. Repeated in Spring and Summer

SIDNEY J. ADAMS
THOMAS J. HICKEY

Intended for persons who wish to become supervisors or administrative assistants or who are now serving in such capacity in a small organizational unit. Deals with the "HOW" aspects of the day to day assignments for which these persons ordinarily are responsible, such as preparation of budget data for small organizational units; preparation of recommendations on personnel actions in a typical organization; the maintenance of office records; orientation and assignment of new employees; essential requirements for good supervision.

The second part of this course deals with the introduction to administrative planning, administrative procedures and management generally at the lowest organization level, including work reporting and work measurements, work processes and work control reports; relation of these studies to the budgetary and personnel needs of the unit; and the theory of staff versus operating jurisdiction over administrative planning.

208. Advanced Administrative Procedure

Fall, 2 credits. Repeated in Spring

JOHN D. MOSELEY

Intended for persons who are now assigned to administrative assistant and supervisory positions. Deals with (1) the conduct of administrative and procedural surveys and audits directed toward the development of factual data for management purposes; the analysis of these data, the preparation of reports and recommendations thereon; (2) the putting into effect of the approved recommendations through the actual drafting of procedural instructions and the designing and standardization of forms; (3) the installation of approved procedures and the establishment of executive controls to insure compliance with approved instructions; (4) the modern and tested techniques and methods ordinarily used in developing factual data and graphic presentations regarding flow of work, organization structure, work assignments, authority, work duplications, delays and bottlenecks; (5) report writing; (6) the value of illustrated presentations of work processes in eliminating duplication of work, in simplifying operations and in cutting out unnecessary steps; (7) the value of and the need for specific written manuals of instructions as tools of management; and (8) the relation of these instructions to those taught in the other Office Techniques and Operations Courses. *Prerequisite:* Completion of one of the following courses in Office Techniques and Operations: 108, 110, 112, 114, 115, 116, 117, 210.

101. Business Mathematics

Fall, 2 credits. Repeated in Spring and Summer

RALPH R. BOTTS

Designed for clerical workers who are called upon to apply fundamentals of arithmetic to their jobs. Emphasis will be placed on review of business arithmetic including fractions, ratios, proportion, percentages, common divisors and multiples, progressions and elementary graphs and statistics. Special applications will be made to business problems such as simple interest; simple, bank, cash and trade discount; profit and loss; sales turnover; equation of partial payments and accounts; commuting debts; compound interest; compound discount; and annuities. Use of calculating machine will be explained.

110. Federal Auditing Procedure

Fall, 2 credits. Repeated in Spring and Summer

CAREY G. CRUIKSHANK

This intensive one-semester course is intended for those having no previous knowledge of the subject and is designed to furnish fundamental training for employees now in lower grades as clerks, typists, machine operators, etc., who intend to take the course on Advanced Federal Auditing Procedure or who have opportunities of eventually becoming auditors by serving apprenticeships. It covers explanations of, discussions on and practice work with the two most common types of Government vouchers; deals with, to a limited extent, certain related documents and procedures and should prepare students for higher grades and better-paying positions. The Manual outlines in detail various pertinent procedures.

Embraces general and basic principles; definitions of terms, description and use of standard forms involved, authorizations and allocations; general procedure in auditing standard form 1034 vouchers; suspensions and disallowances, General Accounting Office exceptions and replies; purchase order procedure and its relation to auditing; tax exemption procedure and its effect upon auditing; general procedure in auditing standard form 1012 vouchers; authority for travel, emergency travel per diem allowances, method of computation; methods of travel, duty status and leave, application of statutes, regulations and Decisions of the Comptroller General; exigency statements, special correspondence; and practice audit work on standard form 1034 "purchase" vouchers and standard form 1012 "reimbursement" vouchers.

210. Advanced Federal Auditing Procedure

Spring, 2 credits

EMMETT B. COLLINS

Includes explanations of and discussion on Federal auditing policy and practice along advanced lines. Covers the relationship of auditing to general fiscal control; administrative examination of fiscal documents; application of legislation and regulations; use of Comptroller General Decisions; relation of Comptroller General's Decisions to particular cases; normal methods of handling suspensions, disallowances, certifications, etc.; unusual problems in the audit of standard form 1034 vouchers and 1012 vouchers; relationship of procurement to auditing and the policies followed in the use of purchase orders; authority for travel and policies relating thereto; per diem allowances and computations, and policies respecting rates; transportation of property and personnel, use of transportation requests and bills of lading; audit of transportation vouchers; audit of payrolls and application of payroll procedures; General Accounting Office exceptions and preparation of replies; claims, adjustments and direct settlements. This advanced course in Federal Auditing Procedure is designed to assist auditors to prepare themselves for more responsible and more remunerative positions. *Prerequisite:* Federal Auditing Procedure or equivalent experience.

112. Federal Accounting Procedure

Fall, 3 credits. Repeated in Spring and Summer

JOHN L. TIERNEY

Designed particularly to train accounting clerks through instruction of employees now working in lower grades and to assist accounting clerks in present and prospective positions. It embraces explanation of, discussion on, and practice work with the basic ledgers (allotment ledger, objective classification ledger, and general ledger) maintained in connection with funds made available to Federal agencies. Appropriation, apportionment, allotment, disbursement, collection, and reporting processes will be discussed and the relationship between administrative accounts and accounts kept by the Treasury Department and the General Accounting Office explained.

116. Federal Budgetary Procedure

Fall, 2 credits. Repeated in Spring

EUGENE B. WILHELM

This course is designed to assist employees either in budget work or preparatory to taking budget work, up to and including Grade CAF-9. It deals

with budgetary procedures, including the preparation of estimates, justifications, tabular statements, graphs, etc., and, in connection with budget execution, outlines methods in making allotments, operating budgets, analysis of reports, preparation of apportionment and obligation reports, and other methods used in the formulation and execution of the Federal budget.

122. Federal Payroll Procedure

Fall, 2 credits

LOUISE M. KRUEGER and WILLIAM E. MARSHALL

This course deals with the basic principles and procedures relative to paying compensation to Federal employees, including pay computation, deductions, pay roll preparation with special emphasis on the "Simplified Payrolling Procedure" prescribed by the General Accounting Office, scheduling, processing the voucher, pay roll adjustments, and Decisions of the Comptroller General relating to pay. In addition the course will cover the necessary accounting work involved in individual earnings, retirement, tax, bonds, and other deductions, and reconciliation of records within the pay roll unit and with the general accounting records. It is designed to assist present and future pay roll clerks in understanding the current Federal Employees Pay Act and in operating under the "Simplified Payrolling Procedure."

115. Federal Purchasing Procedure

Fall, 2 credits

JAMES SCAMMAHORN

Elementary principles and ethics of Federal purchasing in general and its relation to operating programs; historical background; organization for purchasing; purchasing and contracting authority; basic practices and procedures with legal and administrative background; use and preparation of requisition, purchase order, bid, bill of lading; voucher and other procurement forms; sources of supply such as General Supply Schedules, Government warehouses, prison industries, blind-made products; War Assets Administration, commercial market, and how to use such sources; open market and bid purchases; leasing of space; preparation, inviting and award of bids, including fundamentals of writing specifications; advertisements in publications; formal contracts, including source of supply contracts, and bid and performance bonds; inspection of deliveries for compliance with specifications.

215. Advanced Federal Purchasing Procedure

Spring, 2 credits

JAMES SCAMMAHORN

Standard Federal Specifications, what they are and how to use them; warehousing, storage and issue; property accountability and relation of purchasing to utilization and property management; traffic and transportation rules and procedures to be followed in making shipments of supplies and equipment and employees' household goods; disposition and sale of surplus personal and real property under Surplus Property Act of 1944; use of U. S. Standard Commodity Classification and Handbook of Description of Property; exchange of property; excise taxes; procurement of special items; laws, Decisions of the Comptroller General and regulations affecting procurement; and relationship between the service and supply and related service functions such as accounting, fiscal and budgetary processes. *Prerequisite:* Federal Purchasing Procedure.

114. Federal Personnel Procedure

Fall, 2 credits. Repeated in Spring and Summer

VERNA C. MOHAGEN

Deals with the elementary principles and procedures of Federal personnel administration, including a study of the Federal personnel structure and organization, history and progress of the merit system, rules and regulations of the Civil Service Commission, and other basic procedural sources; use of personnel forms, records and files systems; Civil Service examinations and recruitment; appointments; transfers; promotions; separations, terminations and reductions in force; suspensions and disciplinary actions; retirement; efficiency

ratings; leave and hours of duty; personnel reports, applications of Decisions of the Comptroller General, administrative policy statements, and administrative orders.

214. Advanced Federal Personnel Procedure

Fall, 2 credits. Repeated in Spring

VERNA C. MOHAGEN

Similar to Federal Personnel Procedure but more thorough in its treatment of the subject. Deals with advanced principles and techniques in Federal personnel procedures and their relation to operating programs, including a study of the principles of the Civil Service Act, Rules and Regulations, and their application to day-to-day problems in a Federal personnel office; recruiting sources for Civil Service examinations and appointments; study of promotion-from-within procedures; reduction-in-force procedures, and their application to specific operating situations; policies and their procedures for the handling of veterans' problems including placement of returning veterans; study of procedures for systematic retirement of employees reaching annuity age; procedures for investigation and enforcement of discipline; periodic reports and their use for operating purposes; procedure and policy statements in the general field of personnel administration; procedural source materials such as the Civil Service Commission, Federal Personnel Manual, Decisions of the Comptroller General, Executive Orders, etc., and applying them to detailed operating procedures; relationship of the personnel office to budget, accounting, payrolling, and other staff functions. *Prerequisite:* Federal Personnel Procedure or equivalent practical experience in a Federal personnel office at Grade CAF-4 or above.

117. Records Management Procedure

Fall, 2 credits

L. E. DONALDSON and Lecturers

Instruction in basic practices and procedures for maintaining and servicing Government records including mail and messenger service. Includes detailed instructions and actual practice in methods of recording communications, and classifying, coding, indexing and filing correspondence and other documents. Designed for students who desire to enter this field or who are interested in supplementing their knowledge of the mechanics of record keeping.

217. Advanced Records Management

Spring, 2 credits

L. E. DONALDSON and Lecturers

Designed to give the student a comprehensive knowledge of the management of Government records. Principles of good records management; the organization and functions of records offices; planning and simplifying procedures; work flow; space arrangement; and system selection and installation. Also includes a discussion of laws and regulations governing preservation and disposal of records, appraisal, systematic retirement, storage, disposal and microphotography. *Prerequisite:* Records Management Procedure or equivalent or consent of instructor.

413. Office Management

Fall, 2 credits. Repeated in Spring

DANIEL M. BRAUM

Designed to give supervisors and administrative assistants familiarity with the fundamental principles and methods needed by them to do a satisfactory management or supervisory job. Deals with the common day to day administrative problems and questions encountered by supervisors such as, (1) determination of space requirements and proper space allocation with due regard to flow of work; (2) the utilization and care of all existing facilities—equipment, labor saving devices, communications, etc.; (3) discussion of the effect of heat, light and ventilation on the morale and output of employees; (4) development and use of management tools in the Federal Government; (5) planning for improvements—how to secure participation by officials, supervisors and employees in suggesting and making improvements; and (6) a treatment of many management aides and devices not specifically covered in other Graduate School courses.

GOVERNMENT LETTER, REPORT, AND PROCEDURAL WRITING**120. Government Letter Writing**

Fall, 2 credits. Repeated in Spring

VERNE L. SAMSON

The writing of clear, accurate, concise, courteous letters and memoranda contributes to efficiency and economy in administration. This course gives the student (1) opportunity to work out the principles of effective letter writing; (2) practice in criticizing and revising outgoing correspondence, and in planning and drafting replies to incoming letters; and (3) drill in the fundamentals of good writing.

440. Writing Procedures and Instructions

Fall, 2 credits

TEN M. F. ALLSMAN

A course of instruction in how to develop, write, and issue manuals, circulars, office memoranda, and other forms of rules, regulations, instructions, and procedures. Special attention will be given to ways of improving the readability of such material, particularly through logical organization of the subject matter, the use of a clear, simple style of writing, and proper format. Consideration will also be given to: (1) Relations of the procedures' writer with subject matter specialists and administrators; (2) Assembling source materials and drafting issuances; (3) Editing issuances drafted by others; (4) Obtaining approvals; (5) Codifying; (6) Indexing; (7) Coordinating issuances.

SHORTHAND

These courses are designed to furnish Federal employees an opportunity to follow a program of training for stenographic careers in the Federal service. While each course represents a separate unit of study, with emphasis on material used in the Federal service, a proper sequence of courses insures a sound foundation for successfully qualifying for the various grades and classifications of stenographers in the Federal service.

"Review of Gregg" will serve as rapid review for the student who has not applied his shorthand knowledge for a long time, or has used it so little that he feels uncertain about applying his knowledge to practical office dictation. Students finishing "Beginning Gregg Shorthand I" may continue with "Beginning Gregg Shorthand II" and then the "Gregg, 70 to 100 Words." Because the "Gregg, 100 to 130 Words" course is an intensive course on technical material, students should have a sound foundation in theory and be able to write 100 words a minute with a 95 percent accurate transcript before registering for the course. Home study is required to attain goals set in course descriptions. Amount of study required varies according to the learning habits and individual goals of students.

A prerequisite for all shorthand courses is the ability to type-write with a fair degree of accuracy and speed.

As a general guide to assist employees who wish to plan a course of study to build for a stenographic or stenographic-reporting career in the Federal service the following parallels are drawn:

<i>Course</i>	<i>Goal</i>	<i>Prerequisites</i>
I. Beginning Gregg Shorthand I	Thorough knowledge of shorthand theory up to disjoined prefixes and suffixes; mastery of brief forms; ability to write legible outlines and to take dictation of new and practiced material; ability to read shorthand plates at a fairly rapid rate.	For those who have not studied shorthand, or for those who have some knowledge of shorthand but have not completed basic theory.
II. Beginning Gregg Shorthand II	Completion of theory; mastery of prefixes, suffixes, special forms, and abbreviated words; ability to take dictation of business letters and standard test material at 70 words a minute and to produce mailable transcripts.	For those who have completed "Beginning Gregg Shorthand I" or its equivalent.
III. Gregg Shorthand 70 to 100 Words	Complete theory review; ability to take dictation at 100 words a minute for 5 minutes; ability to produce acceptable transcripts of letters and reports dictated at rates varying from 70 to 100 words a minute.	For those who have completed Shorthand I and II or equivalent theory and dictation courses and who have a minimum speed of 70 words a minute on new, standard material.
IV. Gregg Shorthand 100 to 130 Words	Ability to take dictation of new, standard material at 130 words a minute for 5 minutes; ability to produce, at a good rate of speed, accurate transcripts of letters, reports, conferences, and telephone conversations.	For those who have a minimum dictation speed of 100 words a minute and who are able to produce accurate transcripts of letters and reports.
V. Introduction to Reporting—Gregg (130 to 150 Words)	Ability to record conferences and hearings 60 to 70 percent verbatim; introduction to reporting techniques.	For those who have qualified on 130-word a minute standard tests or their equivalent.
VI. Reporting—Gregg (150 Words and up)	Ability to use high-speed short-cuts and advanced reporting methods; verbatim reporting of lectures, hearings, and conferences.	For those who have qualified on 150-word a minute standard test or the equivalent.

89. Review of Gregg Shorthand

Fall, non-credit. Repeated in Spring and Summer

NAOMI H. EVANS

A review of theory and brief forms. Reading from shorthand plates and students' own notes; dictation of standard material at various progressive rates of speed. *Prerequisite:* Completion of the Gregg Manual or its equivalent by the functional system.

129. Beginning Gregg Shorthand I

Fall, 3 credits. Repeated in Spring and Summer

CLARA RICHTER
BERNIECE H. DWYER**130. Beginning Gregg Shorthand II**

Fall, 3 credits. Repeated in Spring and Summer

CLARA RICHTER
BERNIECE H. DWYER**230. Gregg Shorthand, 70 to 100 Words**

Fall, 3 credits. Repeated in Spring and Summer

ETHEL W. MORGAN

231. Gregg Shorthand, 100 to 130 Words

Fall, 3 credits. Repeated in Spring

FAIRAH L. CRUZAN

335. Introduction to Reporting—Gregg, 130 to 150 Words

Fall, 4 credits

BERNARD P. FOOTE

336. Reporting—Gregg, 150 Words and Up

Spring, 4 credits

BERNARD P. FOOTE

338. Shorthand in Spanish

Fall, 2 credits

SOFIA KRISSILLAS

An elementary course covering basic principles and outlines of Spanish Gregg Shorthand Manual and progressive dictation in Spanish through supplemental exercises and business correspondence; emphasis on accuracy. *Prerequisite:* Thorough knowledge of Spanish.

339. Shorthand in Spanish

Spring, 2 credits

SOFIA KRISSILLAS

Dictation of business letters and commercial articles on Latin American subjects; reading of notes; incidental review of Spanish Gregg Shorthand Manual. *Prerequisite:* Shorthand in Spanish or equivalent.

Department of Physical Sciences

DEPARTMENTAL COMMITTEE

HENRY STEVENS, Ph.D., In Charge, Chemical Investigations of Allergens in Agricultural Products, Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, USDA (Chairman)

R. D. BENNETT, Ph.D., Technical Director, Naval Ordnance Laboratory, Department of the Navy

S. W. BOGGS, M.A., Special Consultant on Geography, Department of State

ELSA ORENT KEILES, D.Sc., Principal Nutrition Chemist, Bureau of Human Nutrition and Home Economics, Agricultural Research Administration, USDA (Vice-chairman)

CHARLES E. KELLOGG, Ph.D., Chief, Division of Soil Survey, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA

L. W. CURRIER, Ph.D., Geologist, U. S. Geological Survey, Department of Interior

CHARLES F. SARLE, Ph.D., Head, Division of Special Farm Statistics, Bureau of Agricultural Economics, USDA

L. B. TUCKERMAN, Ph.D., Assistant Chief, Division of Mechanics, National Bureau of Standards, Department of Commerce

HARRY WEXLER, Ph.D., Chief, Special Scientific Services Division, U. S. Weather Bureau, Department of Commerce

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Courses offered in this department reflect the dependence of governmental functions on the principles and applications of the physical sciences. Unusual opportunity is afforded for advanced study in special fields under the guidance of scientists whose professional interests are directed to the subjects of their courses. Other courses are designed to provide basic training for entrance to or advancement in the professional scientific occupations.

Familiarity with the fundamentals of the physical sciences, short of a working knowledge, is widely recognized as a useful asset to those whose cultural or professional interests are directed to the economic and social aspects of government. Accordingly, the curriculum of this department includes facilities for securing formal instruction in the fundamental sciences.

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Course Numbers and Symbols—Below 100, non-credit; 100–399, undergraduate; 400–699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

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CHEMISTRY

[100.] General College Chemistry (1949–50 and alternate years)

ROBERT G. WILLIAMSON

248. Organic Chemistry

Year, 4 credits each semester (every fourth year)

ELLIS HAWORTH and ROBERT G. WILLIAMSON

A study of the fundamental principles of organic chemistry, including electronic structure of organic compounds, resonance, classification, nomenclature,

and type reactions. Emphasis is placed upon the importance of carbon compounds in present-day civilization (industry, chemotherapy, and biochemistry). The laboratory work consists of acquiring organic techniques, preparing typical compounds, and studying their characteristic reactions. The class meets in the Chemistry Laboratory of Wilson Teachers College, 11th and Harvard Streets, N. W. *Prerequisite:* General college chemistry.

[250.] Quantitative Analysis (1950-51 and every fourth year)

ELLIS HAWORTH

400. Advanced Organic Chemistry

Year, 2 credits each semester

C. VERNE BOWEN

An advanced course in principles of organic chemistry. Reactions of the aliphatic, aromatic, carbocyclic and heterocyclic compounds will be considered. Newer developments will be presented. This course may be used as a refresher course. *Prerequisite:* Organic chemistry.

[349.] Physical Chemistry (1949-50 and alternate years)

WALTER J. HAMER

Prerequisite: College chemistry and calculus.

522. Advanced Biochemistry

Year, 2 credits each semester

CARTER D. JOHNSTON

A detailed study of behavior and properties of enzymes; the nature of biological catalysis; hydrolytic, phosphorolytic, and oxidizing enzymes; intermediary metabolism of amino acids, carbohydrates, and fats; and photosynthesis. Lecture with discussion by the class. *Prerequisite:* Elementary biochemistry or consent of the instructor.

762. Electrochemistry

Year, 2 credits each semester (alternate years)

WALTER J. HAMER

Lecture course on fundamentals of electrochemistry. It deals first with the laws of electrolysis, coulometers, electrolytic conductance, ionic migration, and transference numbers. Discussions are included of ionic equilibria, ionization constants, determinations of pH or hydrogen-ion activity, and potentiometric and conductometric titration. These are followed by studies of the mechanism of electrode processes, galvanic cells, oxidation-reduction potentials, passivity and overvoltage of electrodes, electrode polarization, the polarograph, and electrophoresis. The course concludes with brief discussions of electrical properties of plastic solids; characteristics of dry cells, storage batteries, and rectifiers; and the factors involved in electrorefining, galvanic corrosion, and electroplating. *Prerequisite:* Physical chemistry or permission of the instructor.

COMMITTEE ON EARTH SCIENCES

S. W. BOGGS (Chairman)

ROLLIN S. ATWOOD, Ph.D., Assistant Chief, Division of International and Functional Intelligence, Department of State

CARLETON P. BARNES, Ph.D., Chief Analyst, Soil Uses and Productivity, Division of Soil Survey, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA

W. H. BRADLEY, Ph.D., Chief Geologist, Geologic Branch, U. S. Geological Survey, Department of Interior

L. W. CURRIER
CHARLES E. KELLOGG
CHARLES F. SARLE

GEOGRAPHY AND GEOLOGY

420. Physiography of Eastern United States

Fall, 2 credits (alternate years)

LOUIS L. RAY

A survey of the physiographic provinces and sections of the United States lying east of the Great Plains. The work of the course will involve lectures, informal discussions, reviews of significant papers, and map studies, with special emphasis on the geologic foundations of land forms. *Prerequisite:* Courses in physical and historical geology.

[421.] Physiography of Western United States

LOUIS L. RAY

SOIL SCIENCES

156. Soil Conservation

Fall, 2 credits

J. GORDON STEELE

The soil as a resource and why we need to conserve it. Brief review of physical features and land use in the United States as they affect soil conservation. Properties of soil and water. Erosion processes. Farm conservation plans, including the land inventory and the choice and application of conservation practices on the farm. Community action through soil conservation districts. Estimates of the conservation job.

A knowledge of farming, and some previous training in earth sciences, biology or other related subjects are desirable but not essential. Outside readings and reports will be assigned according to the interests and background of the students.

157. Soil Fertility and Management

Fall, 3 credits

ROBERT Q. PARKS

Factors that determine the fertility of the soil and its response to fertilization, liming, green manuring, and other practices are developed. Attention is given to the determination of fertilizer needs and the use of fertilizers in relation to soil conditions, crops grown, and the development of a management system on the individual farm. The properties and use of commercial fertilizer materials and mixtures are discussed.

531. Soils: Their Morphology, Genesis, and Classification

Spring, 3 credits

ARNOLD C. ORVEDAL

The nature of soils and the broad principles governing their behavior are first discussed, followed by consideration of soil morphology, formation, and classification. Particular attention is given to characteristics of the great soil groups and their genesis in relationship to the physical and biological forces of the environment. Soil geography of the United States is dealt with broadly, but some examples from other parts of the world are used. Throughout the course, relationships of soil characteristics to agricultural development, soil use and conservation, and patterns of human occupancy are emphasized. *Prerequisite:* Freshman chemistry or its equivalent. Previous or collateral reading in plant physiology, geology, geography, and logic would be helpful, but not essential.

METALLURGY

452. Principles of Physical Metallurgy

Fall, 2 credits

BLAKE M. LORING

Development, meaning, and use of equilibrium diagrams for binary alloys. Iron-carbon diagrams and their relation to cast iron and steel, and to the criti-

cal points important in heat-treating ferrous alloys. Steel-treating processes depending on non-equilibrium conditions, including the TTT-Curve. Alloy steels. Aging and precipitation hardening. Segregation and other ingot defects. Mechanical and physical tests, including the interpretation of micrographs. Non-ferrous alloys of industrial importance. *Prerequisite:* College chemistry and physics.

526. Advanced Physical Metallurgy

Spring, 2 credits

BLAKE M. LORING

Basic concepts of the physics of metals are discussed in order to develop a better understanding of the common mechanical tests and manufacturing processes. Topics include: definition of a metal; introduction to the crystalline nature of matter; classification of metallic elements according to crystalline structure; relationship between crystalline structure and physical properties; the equilibrium diagram and its relation to physical properties and crystalline structure; introduction to X-ray metallography with calculations from diffraction patterns of metals (illustrated); X-ray evidence of cold working and recrystallization; internal stresses in metals; plastics deformation; theory of metal hardening, ferrous and non-ferrous; diffusion and diffusion processes. *Prerequisite:* Principles of physical metallurgy.

METEOROLOGY

162. Principles of Meteorology

Spring, 2 credits

CHARLES B. JOHNSON

A course of a descriptive nature explaining the principles of meteorology essentially on a non-mathematical basis. Especially adapted to preparation for sub-professional employment in the Government and to obtaining the basic meteorological knowledge required of a civilian pilot. Arrangements will be made to study forecasting and observing techniques at the Washington National Airport.

310. Applied Climatology

Fall, 2 credits

WOODROW C. JACOBS and STAFF MEMBERS

Course consists of a study of modern climatological methods as applied to the weather problems of business, industry and agriculture. A knowledge of the basic principles of meteorology is required but the essential statistical and climatological tools are developed within the course. A knowledge of elementary statistics is helpful but not a prerequisite. Special problems are assigned in lieu of laboratory work.

533. Hydrology

Year, 3 credits each semester

RAY K. LINSLEY

A two-semester course in basic and applied hydrology at the professional level. The first semester will be largely descriptive, covering such topics as elementary hydraulics; measurement and interpretation of streamflow, precipitation and other basic data; the hydrologic cycle; physics of soil moisture; the infiltration theory; wave travel and the unit hydrograph. The second semester will cover the development and application of procedures for applying basic hydrology to practical problems of river forecasting and design of water control works including such subjects as streamflow routing, flood frequency, the rational method of estimating flood magnitude, hydrometeorology, forecasting of runoff, influence of water control structures on streamflow, and problems of water control operation. *Prerequisite:* Physics and algebra; elementary meteorology, statistics, and engineering desirable.

[534.] Introduction to Dynamic Meteorology (1949-50 and alternate years)

Prerequisite: Calculus.

SIDNEY TEWELES, JR.

536. Physical and Synoptic Meteorology

Year, 3 credits each semester

ALEXANDER L. SHANDS

A two-semester course in the fundamentals of modern meteorology for the professionally interested student. The first semester stresses the physical aspects—atmospheric composition and structure and their measurement; gas laws; adiabatic, pseudo-adiabatic, and non-adiabatic processes; thunderstorms; fog; wind. The second semester stresses synoptic features—general and local circulations, air masses, fronts, cyclones and anticyclones, upper-air charts, forecasting. Problems involving basic units and graphic manipulations will be assigned. *Prerequisite:* Physics and algebra; trigonometry and elementary meteorology desirable.

537. Weather Analysis and Forecasting

Year, 3 credits each semester (alternate years)

THOMAS I. GRAY, JR., and JAY S. WINSTON

This course provides practical experience in the analysis of various weather charts of sea level and the upper air. Considerable practice is given in preparing weather forecasts from various sea-level, upper-air and local surface data. Lecture and laboratory. *Prerequisite:* Physical and synoptic meteorology.

PHYSICS

153. College Physics

Year, 4 credits each semester

WILLIAM A. KILGORE

An introductory college course consisting of lectures, demonstrations, and individual laboratory work.

First semester: Mechanics, heat, and sound, with major emphasis upon the concepts of mechanics.

Second semester: Light, electricity, and electronics, with major emphasis upon electricity.

The class meets in the Physics Laboratory of Wilson Teachers College, 11th and Harvard Sts., N. W. *Prerequisite:* Two years high school mathematics and one year high school physics or equivalent.

[430.] Introduction to Modern Physics (1949-50 and alternate years)

MARTIN A. GARSTENS

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NATIONAL BUREAU OF STANDARDS EDUCATIONAL COURSES

The Educational Committee of the National Bureau of Standards has developed a series of courses to provide graduate training in physics. The courses are of graduate grade and are recognized by many of the leading universities in granting credit for advanced degrees. Although these courses are planned primarily for members of the staff of the National Bureau of Standards and are given

at the laboratories of the Bureau, other qualified students may enroll. Persons outside the National Bureau of Standards wishing to enroll may secure additional information from the Graduate School.

Besides the out-of-hours graduate courses, the National Bureau of Standards has organized a large number of highly specialized in-hours courses to train members of the staff in their special work. Although these courses are planned primarily for members of the Bureau staff, individuals from other Government agencies may be admitted on official request from their agencies.

Information about courses may be obtained from the Registrar, Mrs. L. L. Chapin, at the National Bureau of Standards.

Department of Public Administration

DEPARTMENTAL COMMITTEE

WILLIAM G. FINN, M.S., Special Assistant to Assistant Administrator for Production, Production and Marketing Administration, USDA (Chairman)

GLADYS L. BAKER, Ph.D., Agricultural Historian, Bureau of Agricultural Economics, USDA

H. DEAN COCHRAN, D.Sc., Chief, Division of Personnel Management, Forest Service, USDA

EARL W. LOVERIDGE, B.S.F., Assistant Chief, Forest Service, USDA (Vice-chairman)

WILLIAM A. MINOR, B.S.A., Assistant to the Secretary of Agriculture, USDA

HARLOW S. PERSON, Ph.D., Consulting Economist, Office of the Administrator, Rural Electrification Administration, USDA

DON K. PRICE, B.A., Associate Director, Public Administration Clearing House

DONALD C. STONE, M.A., Assistant Director, In Charge of Administrative Management, Bureau of the Budget

JOHN THURSTON, Ph.D., Secretary, Administrative Council, USDA

COMMITTEE ON GENERAL ADMINISTRATION

HARLOW S. PERSON (Chairman)

JOHN M. CARMODY, Former Commissioner, U. S. Maritime Commission

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DILLARD B. LASSETER, M.A., Administrator, Farmers Home Administration, USDA

EARL W. LOVERIDGE

LEONARD D. WHITE, Ph.D., Professor of Public Administration, University of Chicago

OPPORTUNITIES FOR STUDY AND WORK

The importance of public administration is apparent in the modern state with its emphasis on services, control, operation, and collective action in the public interest. The more the public service is called upon to assume functions previously exercised by individuals or private enterprise the greater the importance of the principles and techniques of public administration. Management problems raised by the war illustrate the critical need for more and better training in public administration, particularly in the junior and assistant positions, even in normal times. The increasing delegation of discretion to administrative agencies has raised unprecedented problems of organization, public consent, and administrative responsibility.

Washington is of necessity the national focal point of all these developments. Many of the ablest and most experienced public administrators are assembled in Washington. Many of the most competent practitioners of the various specialized branches of administration are likewise concentrated in Washington. Utilizing this unique environment and this unexcelled talent, the Graduate School offers courses geared to demonstrated needs and taught by experienced administrative personnel.

SUGGESTIONS FOR PROGRAM OF STUDY

Courses in this Department cover a wide range of approaches for varying levels of responsibility. Some give background and attitude, and some give methods and skill. Some have their objectives high and broad for perspective and knowledge of relationships; some have their objectives comparatively narrow and sharply focused for skill and ability to perform particular tasks. It is hoped that students will select those courses which supplement and complement their work assignments rather than concentrate exclusively on more intensive training in the performance of daily tasks.

General Administration. These courses provide a general background and give an insight into the whole area of administrative responsibility. Effective administration requires a thorough knowledge of the job to be done including objectives and policies; an adequate and appropriate organization structure, appropriate planning with simple yet adequate methods and procedures for doing the job; and such controls and reports as are needed to measure results achieved and to assure progress. The framework for achieving these ends is considered in the basic and more particularly in the advanced courses in this division.

Unless he has had such basic courses the student should begin with a course in American National Government, followed by Introduction to Public Administration. Students interested in special branches of study (e.g., personnel or financial administration) are urged to begin with these two general courses for maximum usefulness and understanding.

Financial and Budgetary Administration. Students desiring a knowledge of how the Government obtains, budgets and manages its money will find helpful the introductory courses in general administration followed by the specialized courses in this division. Those with limited experience in this field will wish to begin their study with Federal Budgetary Procedure, continue with Financial Organization and Procedures of the Federal Government, before attempting the advanced course in Budget Formulation and Budget Execution.

Organization and Methods Analysis. These courses are offered to afford students an opportunity for progressive study and advancement in the general field of organization and methods work (hereafter called O&M work). Scientific management as found in industry is, in part, translated and applied to governmental operations. The courses use to advantage, among other background data, the instructional and case materials developed by the Bureau of the Budget and by other governmental agencies. A student progressing through these courses should develop a well balanced

understanding of the principles, techniques, and administrative aspects of O&M work. The courses are designed for students with varying degrees of experience in this field.

Personnel Administration. The student is urged to begin with the general introductory courses in public administration before concentrating on the program in this division. Unless substantial experience can be substituted, the general course, Personnel Administration, should be taken before the specialized courses (such as Position Classification, Selection and Placement, etc.). Persons who are in positions classified as Grade CAF-5 or below and desire to prepare for personnel work should begin with Federal Personnel Procedure; they should not attempt to take the specialized courses until they have gained substantial experience in personnel work or have carefully laid a foundation by completing all basic, general courses.

Procurement and Property Management. Courses in this area deal with how the Government purchases, manages and accounts for materials and supplies. Those interested in purchasing but with limited experience, will find it helpful to begin with the introductory courses in general administration to be followed by courses in Federal purchasing procedure before attempting the management courses.

Accounting and Auditing. Students in classification grades below CAF-5 will find it advantageous to begin with Federal Accounting Procedure or Federal Auditing Procedure. Preparation for higher-level accounting should begin with a year's study of Principles of Accounting, after the completion of which Federal Government Accounting may be taken. Intermediate Accounting, Cost Accounting, Auditing, Federal Tax Accounting, Advanced Accounting Problems, and Analysis and Interpretation of Financial Statements provide advanced training for those who desire to progress further with a general accountancy program. (See p. 76 for Certified Statement of Accomplishment in Accounting.)

CERTIFIED STATEMENT OF ACCOMPLISHMENT IN PUBLIC ADMINISTRATION

The program leading to a Certified Statement of Accomplishment in Public Administration should be of special interest to:

1. Persons already employed in responsible administrative positions. Included in this group are many with specialized training who have been transferred to administrative positions from professional positions without training or previous experience in administration.

2. Administrative assistants and administrative technicians of all kinds.
3. Recently recruited Junior Professional Assistants. Those who entered the service with a public administration option may profit from courses both more advanced and more specialized than those taken in college. Those who entered on various professional options and are now employed in such professions can profit very greatly from these courses if they expect, or wish to prepare, to enter into administrative work connected with their professional fields.
4. Employees who wish to broaden their understanding and improve their efficiency through a "tour of duty" by study, in lieu of an actual tour of duty for which they have found no opportunity.
5. Employees with college background who aspire to transfer to a career in administrative management.

Approach

Broad-gauge, essentially long-range approach to develop leadership, perspective, broad outlook, and understanding of the human factors in administration; emphasis on principles, with opportunity for study of some techniques in relation to policy.

Objectives

Ultimately, for policy formulation, improvement of administrative machinery, coordination of operations, and general management and control of large units. Immediately, for initial investigations as a junior member of a staff having the responsibilities named above, for assumption of increasingly difficult and more responsible assignments in these fields, and for supervision and management of small units.

Requirements

1. Bachelor's degree or equivalent. (Note: The degree requirement may be waived in the case of well-qualified students who have received a Certified Statement of Accomplishment in Administrative Procedures.)
2. Twenty-four semester hours of credit in Graduate School courses offered in the Department of Public Administration, excluding all accounting courses except Federal Government Accounting. The 24 credit hours are to be distributed as follows:
 - a. A minimum of four credits from the Division of General Administration.

- b. A minimum of two credits from the Division of Organization and Methods Analysis.
- c. The remaining eighteen credits may be selected from the Divisions of Financial and Budgetary Administration, Personnel Administration, Legal Administration, Procurement and Property Management, Government-Public Relationships or additional courses in *a* or *b* above.

Upon approval, courses outside the Department of Public Administration may be taken where they are properly in line with the student's major interest.

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Course Numbers and Symbols—Below 100, non-credit; 100-399, undergraduate; 400-699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

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DIVISION OF GENERAL ADMINISTRATION

341. American National Government

Fall, 2 credits. Repeated in Spring and Summer

NORMAN J. SMALL
CHARLES W. SMITH

History and origins of the national Government of the United States; the political process—parties and elections; the legislative process; the functions of the national Government and their administration; courts and judicial review of legislation. Students are advised to take this course before Introduction to Public Administration.

344. Introduction to Public Administration

Fall, 3 credits. Repeated in Spring and Summer

DAVID S. BROWN

This course is designed to introduce the student to the elements of public administration. Attention will be devoted to the evolution of administrative organization; organizational types: staff, line, and auxiliary agencies and functions; controls of administration; the broadest aspects of personnel selection, classification, training, movement, and relations; budgeting and fiscal control; federal-state relations; administrative legislation and adjudication. The object of the course is to lay a broad foundation for more intensive courses in management. *Prerequisite:* High school graduation or equivalent, or one course in the Clerical-Administrative Procedures Group, Department of Office Techniques and Operations. Desirable to have had American National Government.

515. The Legislative Process

Spring, 3 credits

GEORGE H. E. SMITH

Information about the legislative process which will tend to facilitate effective cooperation between the personnel of the Legislative and Executive Branches. The functions of Congress; organization of Congress; consideration of bills in committees; consideration of bills on the floor; party leadership in Congress; the functions of the Executive regarding legislation; assistance by executive agencies in the legislative process; relation of non-governmental

groups to legislation; legislative staff aids; congressional investigations of executive agencies as a control mechanism; correspondence, informational, and informal relations between Congress and executive agencies.

The method of teaching the course this year aims at a new approach. To give vitality and practical value to the subject, basic orientation lectures will be supplemented by seminar sessions, visiting experts, visual aids and planned laboratory techniques designed to provide active student participation in Congressional processes.

400. Administrative Operations for Congressional Assistants

Spring, 2 credits

(To be announced)

This course deals with the practical administrative problems encountered by secretaries and other staff assistants to U. S. Senators and Congressmen. Such matters as the following will be considered: organizing the office routines; handling veterans' affairs; relations with the executive departments; the practical workings of Congress and assistance with legislative matters; pressure groups; relations with constituents; political organization and campaigns. Enrollment limited to employees of the Legislative Branch, except by consent of instructor.

626. Federal Administrative Management

Fall, 2 credits

HARVEY E. BECKNELL

An advanced seminar designed to aid persons who are carrying substantial administrative management responsibilities. Emphasis is placed upon the integration of all management functions and the development of a philosophy of management which is equally applicable to all phases. Lectures and discussions cover the following general topics, with particular attention to their interrelationships and interdependence: administrative planning and research; principles of organization; personnel selection, placement, training and relations; administrative leadership, direction, supervision and coordination; administrative reporting; budget formulation and execution; and the auxiliary management services. Practical problems presented by class members for group discussion. *Prerequisite:* Bachelor's degree plus Public Administration Courses 344 and 555, or bachelor's degree in public or business administration, or experience in administrative management at Grade CAF-9 or above.

627. Reporting to Top Management

Spring, 2 credits

PATTERSON FRENCH

Deals with the techniques and substance of reporting to top management in terms of the nature of the top management job and the operator's responsibility for implementing it. Discusses the various kinds of reporting, administrative requirements essential to effective reporting, reporting strategy and techniques, and other factors essential to preparing an effective report to top management. *Prerequisite:* Employment at Grade CAF-11, P-4 or above, or equivalent experience, or consent of instructor.

570. Management Responsibilities for the Administrative Scientist

Spring, 2 credits

WILSON F. HARWOOD

This course is designed to assist persons with backgrounds in scientific or professional fields to carry out effectively supervisory and administrative responsibilities. Techniques and methods will be discussed with respect to work planning, leadership, selecting personnel, organizing the staff, procuring equipment and supplies, budgeting available funds and employees' time, developing efficient work methods, directing and scheduling operations, coordinating effort, developing skills, maintaining high morale, and reporting results. *Prerequisite:* Bachelor's degree, supervisory experience or permission of the instructor.

[610.] Research Projects: Planning and Administration

[727.] Seminar in Problems of National Defense

STEFAN T. POSSONY

DIVISION OF GOVERNMENT-PUBLIC RELATIONSHIPS

COMMITTEE ON GOVERNMENT-PUBLIC RELATIONSHIPS

ROBERT LYLE WEBSTER, M.S., Associate Director of Information, Office of Information, USDA (Chairman)

JOHN CRIDER, B.Litt., Editor-in-Chief, Boston Herald Traveler

WILLIAM A. JUMP, Director of Finance and Budget Officer, Office of Budget and Finance, USDA

WILLIAM V. LAMBERT, Ph.D., Research Administrator, Agricultural Research Administration, USDA

ARTHUR ORR, Executive Secretary, Agricultural Sub-Committee on Appropriations, House Appropriations Committee

MORSE SALISBURY, B.S., Director of Public and Technical Information Service, United States Atomic Energy Commission

JOHN THURSTON

LYLE F. WATTS, M.F., Chief, Forest Service, USDA

710. Public Relationships in Government Administration

Spring, 2 credits

R. L. WEBSTER and SPECIALISTS

Designed to give to Federal administrators and those who look forward to executive positions an appreciation of the scope and fundamental nature of public relationships of a Government agency. Particularly useful, also, to professional Federal information workers through emphasis given on relating all forms of information work to an integrated administrative program. Prominent persons identified with certain of the major fields covered will participate in the conduct of the course.

Course work includes: general review of the place of public relationships in public administration; historical review of the growth of public relations work in the Federal government; public reporting and the Congress; review of public relations activities of other governments; field relationships; some aspects of public relationships of international agencies; evaluation of the major mass media and group contact activity and development of working guides for integrating use of these media into efficient Government administration. *Prerequisite:* Limited to persons holding responsible positions in general or related administrative work, or those in the field of information work, or those who look forward to executive positions and receive the consent of the instructor.

DIVISION OF ORGANIZATION AND METHODS ANALYSIS

COMMITTEE ON ORGANIZATION AND METHODS ANALYSIS

HAROLD A. STONE, M.S., Chief, Division of Fiscal Management, Office of Budget and Finance, USDA (Chairman)

N. ROBERT BEAR, B.S., Chief, Division of Organization and Personnel Management, Office of Personnel, USDA

STANLEY T. GORDON, M.S., Management Analyst, Office of Budget and Management, Office of the Secretary, Department of Commerce

SHIRLEY K. HART, M.B.A., Director, Division of Research and Statistics, Federal Housing Administration

THOMAS J. HICKIEY, LL.M., Deputy Fiscal Director, Bureau of Medicine and Surgery, Department of the Navy

LEONARD W. HOELSCHER, Assistant Chief, Division of Administrative Management, Bureau of the Budget

FREDERICK MOSHER, M.S., Chief, Programming and Administrative Branch, Division of Foreign Service Personnel, Department of State

ORLANDO A. SIMMES, Management Consultant, Division of Organization and Budget, Office of Budget and Planning, Department of State

EDWARD B. WILBUR, A.B., Management Consultant, Office of Budget and Planning, Department of State

555. Principles and Techniques of O&M Work

Year, 2 credits each semester

WILLIAM A. GILL, assisted by DAVID D. LEVINE and JOHN D. YOUNG

Deals with the principles and techniques employed in surveying and analyzing organization and methods problems and in formulating solutions for such

problems. Emphasizes: planning and conducting various types of surveys; organizing and presenting survey facts; forms analysis; establishing effective relationships; the human element in O&M work; ways of dividing work and controlling work flow; presenting recommendations; installing new methods; follow-up. *Prerequisite:* Applicants will file at the time of registration a statement of their reasons for taking the course. Preference will be given to those engaged in O&M work; registration will be accepted from those not now engaged in O&M work and such persons will be admitted insofar as facilities permit.

780. Establishing and Administering O&M Work

Fall, 2 credits

HAROLD A. STONE and JOHNSTON E. LUTON

Deals with the problems of establishing and administering O&M work. Planning and conducting surveys; controlling survey operations; selecting staff; selling recommendations; establishing an O&M unit; responsibilities and authorities of an O&M unit; relationships within and without a bureau, department, and the Government; scope of O&M work; pitfalls to be avoided; control and management of administrative issuances and related topics. Emphasis is placed upon different sets of circumstances encountered in O&M work. Cases are presented both by the students and the instructors. This course is designed for persons who wish to expand their knowledge of the *administrative phases* of O&M work. It is essential therefore that they have previous education or experience or both in the practical application of its techniques. *Prerequisite:* Completion of courses in O&M techniques in a recognized school and consent of instructor, through Graduate School office.

519. Work Measurement and Performance Standards

Fall, 2 credits. Repeated in Spring

I. THOMAS MCKILLOP

Scientific management principles and their application to the work measurement problems of industry and Government; analysis and standardization of work; time and motion study; work measurement as it relates to production planning, production control and cost control; comparison of industrial techniques of work measurement with current Government programs. Each member of the group will select a Government agency and will be required to study and give reports on its work measurement program throughout the semester. At least 7 cases of work measurement in Government will be discussed by the group. *Prerequisite:* Practical working experience at Grade CAF-7 or above, or permission of instructor.

Organization and Methods Clinic

I. THOMAS MCKILLOP, Coordinator

Private firms have a wide range of sources to which they may turn for consultation on special problems in the field of organization and methods work. Opportunities for governmental organizations to obtain similar aid are more limited. To help meet this need and to encourage the understanding and application in the Federal service of effective organization and methods work, the Graduate School provides this Organization and Methods Clinic for those desiring individual consultation and guidance on specific projects in this field.

Each person participating works on an individual basis under the guidance of an expert whose field of specialization is that of the project in question. The consultant will not conduct a survey for the person seeking help, but rather will suggest alternative ways of solving the problem. The clinic affords the O&M analyst an opportunity to have the soundness of his own solution to a problem checked by a disinterested specialist. Personal problems are excluded. Occasional group meetings of those dealing with similar problems may be held where such a step promises to contribute to effective work on individual case problems and is desired by participants.

The clinic is equipped to handle a broad variety of consultative problems.

A resource panel of experts has been developed consisting of the staff of this division and other specialists in O&M work throughout Government.

Those interested in using the Clinic may register at any time. The service is restricted to persons carrying responsibility in organization and management work or carrying responsible staff or line functions. There are no fees involved.

DIVISION OF FINANCIAL AND BUDGETARY ADMINISTRATION

525. Financial Organization and Procedures of the Federal Government

Fall, 2 credits

CARL W. TILLER

A comprehensive summary presentation of Federal fiscal administration, presented primarily on a lecture basis, and including review of the roles of major participants in Federal financial administration: Treasury, GAO, Congressional Committees, Bureau of the Budget, and operating departments. Designed to provide an understanding of the financial organization and procedure of the Federal Government, including such subjects as the Government fund and account structure, and its revenue structure and administration. An orientation course for persons working in some part of the area of financial administration, such as budgeting or accounting, and for potential general or program administration, and others not employed in financial administration. *Prerequisite:* Open, without restriction, but catering in part to desires of budget-staff persons for broader orientation in Federal financial structure and procedure.

635. Agency Budgetary and Financial Administration: Budget Formulation

Fall, 2 credits

RALPH ROBERTS and STAFF

First part of an advanced, two-semester program for experienced budget-staff personnel. Covers the broad phases of budgetary and financial administration in the Federal Government primarily from the standpoint of the operating department.

The course deals with the pre-appropriation phases of budgeting, including formulation, review, and congressional enactment of the budget. Topics discussed include: the role of budgeting in program formulation; the role of bureaus, departments, Bureau of the Budget, the President and Congress in budgeting; content of the budget and of departmental estimates and related budgetary materials; the investment and capital-outlay budgets; review and analysis of budget estimates; budget justification; legislative-administrative relationships in budgeting. *Prerequisite:* One of the following: Course 344 or 525 in Public Administration; Federal Budgetary Procedure; experience at a responsible level in budgetary or financial administration; or consent of instructor.

636. Agency Budgetary and Financial Administration: Budget Execution

Spring, 2 credits

RALPH ROBERTS and STAFF

This is the second part of an advanced two-semester course covering the broad phases of budgetary and financial administration in the Federal Government. Several officials from bureau and department budget offices and other budgetary and financial organizations lecture and lead discussions.

This semester deals with the execution of the budget after it is enacted by Congress and the relationships of administrative planning and control, accounting, auditing, and financial reporting to budget execution. *Prerequisite:* One of the following: Course 344 or 525 in Public Administration; Federal Budgetary Procedure; experience at a responsible level in budgetary or financial administration; or consent of instructor.

DIVISION OF PERSONNEL ADMINISTRATION

COMMITTEE ON PERSONNEL ADMINISTRATION

H. DEAN COCHRAN (Chairman)

JAMES L. BUCKLEY, LL.B., Assistant Director, Office of Personnel, USDA
 VIRGIL L. COUCH, B.S., Director of Personnel, Economic Cooperation Administration
 WILLIAM F. HOWELL, M.S., Personnel Manager, International Bank of Reconstruction and Development
 HAROLD LEICH, A.B., Chief, Program Planning Staff, Administration Services, Civil Service Commission
 ARTHUR B. MCLEAN, M.S., Director of Personnel, Federal Security Agency

RICHARD O. NIEHOFF, Ph.B., Assistant to the General Manager, Atomic Energy Commission
 ROSS POLLOCK, M.A., Chief, Administrative and Social Science Section, Examining and Placement Division, Civil Service Commission
 O. GLENN STAHL, Ph.D., Deputy Director of Personnel, Federal Security Agency
 JOSEPH E. WINSLOW, Adviser on Personnel Management, Division of Administrative Management, Bureau of the Budget

561. Public Personnel Administration

Fall, 2 credits. Repeated in Spring

O. GLENN STAHL

Designed for supervisors and administrators wishing to have general familiarity with personnel work, for those in junior personnel staff positions desiring a broad understanding of personnel administration, and for those desiring to enter the field who need a foundation for the more specialized courses in the personnel field. Personnel problems which arise when people are associated together in a work situation; basic personnel policies and practices necessary and useful in treating personnel problems; differences between responsibilities, with respect to personnel administration, of the supervisor and the personnel officer; the various phases of personnel work; study of merit system and forms of organization; civil service legislation at various governmental levels; relationships between the Civil Service Commission and operating agencies and personnel offices of latter; trends in public personnel administration and its relationship to overall management. *Prerequisite:* One of the following: Introduction to Public Administration; Course 108 or 114 in the Department of Office Techniques and Operations; Grades CAF-4 or above in personnel work; 60 semester hours of college work.

530. Selection and Placement

Fall, 2 credits

ARTHUR B. MCLEAN

Recruiting, evaluation, probation, placement, and promotion of employees, with special reference to the Federal civil service; lectures and discussions. *Prerequisite:* One of the following: Course 344 or 561 in Public Administration; Grade CAF-4 or above in personnel work; 60 semester hours of college work.

629. Tests and Measurements

Spring, 2 credits

JOHN B. CARROLL

Designed for students interested in the application of psychological tests, rating scales, interviews and other devices in modern personnel administration. Topics covered: the theory of measurement; reliability and validity of measuring devices; construction, use and interpretation of tests; types of aptitude, achievement and personality tests; and the use of rating scales and standardized interviews. *Prerequisite:* A course in general psychology and one in statistics, or the equivalent as approved by the instructor.

559. Position Classification

Fall, 2 credits. Repeated in Spring and Summer

ROBERT L. HILL and WILLIAM C. LAXTON

An introductory course designed to give the student an understanding of the fundamental concepts of position classification and its uses; the relation of classi-

fication to compensation and other phases of personnel administration; the historical background of position classification in the Federal service; an analysis of the Classification Act of 1923 and its amendments and its relation to other personnel processes; position analysis and factors to be considered in the allocation of positions. *Prerequisite:* One of the following: Courses 344 or 561 in Public Administration; Grade CAF-4 or above in personnel work; 60 semester hours of college work.

643. Advanced Position Classification

Fall, 2 credits. Repeated in Spring

WILLIAM C. LAXTON and JOSEPH P. FINDLAY

A study of the practical administration of the Federal classification plan. Emphasis will be placed on the actual methods, policies, and practices that influence allocation of positions. Specific positions and their allocation factors will be discussed. *Prerequisite:* A course in Position Classification or experience in position analysis.

720. Seminar in Federal Position Classification

Spring, 2 credits (every third year)

JAMES L. BUCKLEY

This advanced seminar includes analyses and discussions of: strengths and weaknesses of the present Federal classification system; policy development and execution in position classification with respect to intra-agency, agency-Civil Service Commission, and agency-Congressional relationships; and relationships between this and other phases of personnel management, now and in the future. These and related matters are approached through general case problems now facing those carrying executive responsibility in position classification. *Prerequisite:* Registration is limited to persons carrying primary or secondary responsibility for classification programs, to those who have had the equivalent in training of the other courses offered in this field, or to those who, through actual work experience, have a sound knowledge of the technical principles of Federal position classification. Admission by consent of the instructor or Registrar.

305. Fundamentals of Accident Prevention

Fall, 2 credits

JOHN H. WETZEL and ROBERT L. JENKINS

Designed for those in junior staff positions desiring a broad understanding of accident prevention, for those desiring to enter the field who need a foundation for the more specialized courses in accident prevention, and for supervisors and administrators wishing to have general familiarity with accident prevention work. Covers basic approaches to accident prevention; division of responsibilities; technical, economic and social aspects of the accident problem; organization and mechanics of an accident prevention program; and established techniques for reducing accidental wastes in all work programs.

535. Safety Engineering I: Technical Functions

Spring, 2 credits

JOHN H. WETZEL and ROBERT L. JENKINS

The broad principles and phases of safety engineering. An elementary course for technically trained personnel. Includes the engineering approach to solution of accident problems; technical aspects of coordinating the safety objectives and activities of management, engineering and operations; and practical application of safety standards to design, planning and operating methods. *Prerequisite:* Fundamentals of Accident Prevention or degree in engineering or equivalent experience, or consent of instructors.

[620.] Training Management

C. O. HENDERSON

633. Employee Relations and Employee Services

Fall, 2 credits

ASTRID W. KRAUS

This course defines the basic content of an employee relations program. Deals with the formulation of employee relationship policies; the development and application of grievance and other appeals procedures; the techniques for sharing information with employees, for handling employee discipline and for assisting supervisors to appraise and deal with employee problems; the provision of essential employee services, such as housing, child care, transportation, recreation, health and educational information, and so forth, necessary to recruit and maintain an adequate work force. Discussion will also be devoted to the relationship of Government as an employer to its employee groups; the history of union-management relationships in the Federal service; present day problems of affiliation, "collective bargaining" and areas of negotiation on policy formulation and settlement of employee grievances. *Prerequisite:* College degree or personnel work at Grade CAF-7 or above or consent of instructor.

658. Law of Federal Personnel Administration

Fall, 2 credits

RALPH F. KOEBEL and RAWLEIGH L. TREMAIN

Designed to furnish the legal background for courses 561 and 842. Study of legal problems arising out of the Classification Act of 1923, as amended, and other statutory sanctions for Federal employment. Particular topics include: legal aspects of appointment; rates of compensation; hours of employment; overtime pay; promotion; and classification. The effect of wartime legislation on the foregoing matters and on the employment rights of returning veterans will be emphasized. *Prerequisite:* One of the following: Course 344; Course 561 or 842; Grade CAF-5 or above in personnel work; 60 semester hours of college work.

842. Personnel Division Management

Fall, 2 credits

VIRGIL L. COUCH

Application of subject matter covered in Public Personnel Administration. Full instruction and guidance with reference to establishment and operation of the personnel activity of an agency. Problems of internal management in personnel offices and problems of personnel division organization; operating relationships between the personnel office and other staff and line organizations; means of coordinating the respective phases of personnel operations; budgeting and relative cost of a personnel program; how to influence supervisors and others who must carry the responsibility for supervision as a phase of personnel administration; how to make and issue personnel policy; how to plan personnel programs; how to use technicians, deputies and specialists; and types of organization for personnel administration, such as centralized and decentralized and combination types of organization structure. *Prerequisite:* A course in Public Personnel Administration or employment in personnel work at grade CAF-9 or above; or consent of instructor, such consent being based on a review of the training and experience of the applicants.

725. Problems in Federal Personnel Administration

Fall, 2 credits (alternate years)

JAMES L. BUCKLEY

Critical analysis of the major problems of Federal personnel administration, through lectures and discussions. The background, present status and potential alternative solutions of each problem are examined on a case-study basis. Emphasis is on the determination and application of policy, within the framework of legislative and administrative directives. Authority, influence on and contributions to personnel management by the President, Department Heads, Bureau of the Budget, Civil Service Commission, Attorney General, Congressional Committees and Comptroller General. *Prerequisite:* Sound experience in personnel administration or training in political science or administration.

DIVISION OF LEGAL ADMINISTRATION

COMMITTEE ON LEGAL ADMINISTRATION

ASHLEY SELLERS, S.J.D., Attorney at Law (Chairman)

JOHN ANDREWS, LL.B., Chief, Federal State Relations Section, Office of the Assistant Solicitor General, Department of Justice
 THOMAS C. BILLIG, S.J.D., Assistant Solicitor, Office of the Solicitor, Department of Interior
 JAMES DOYLE, LL.M., Associate Solicitor, Office of the Solicitor, USDA
 THOMAS J. FLAVIN, LL.B., Judicial Officer, Office of the Secretary, USDA

RALPH F. KOEBEL, S.J.D., Chief General Legal Services Division, Office of the Solicitor, USDA
 DAVID REICH, LL.B., Special Assistant to the Attorney General, Office of the Assistant to the Attorney General, Department of Justice
 HOWARD WAHRENBROCK, S.J.D., Assistant General Counsel, Federal Power Commission
 WALTER B. WOODEN, LL.B., Associate General Counsel, Federal Trade Commission

663. Legal Aspects of Investigation—Criminal Evidence and Procedure

Spring, 2 credits

RALPH F. KOEBEL

Designed to provide investigative personnel and those desiring to prepare for such work, a background and insight into the legal aspects of their investigations: what types of evidence to seek; circumstances and conditions under which the evidence is to be obtained in order to have adequate probative value; and how to prepare such evidence for presentation in court or other procedure. Since all investigations are potential sources of prosecution, the requirements of criminal evidence and procedure often reach into the early stages of investigation. The instruction is designed to provide understandable information without overemphasis of technical aspects.

320. Introduction to Administrative Law and Procedure

Fall, 2 credits

EDWARD C. JOHNSON

The increased complexity of modern society has meant that administrative agencies have played an expanding role in the regulation of life and property. This course studies the law which controls and the law which is made by governmental officers. Material used includes regulations, orders and decisions which will acquaint students with traditional and current developments in administrative law and procedure. Topics covered include: powers and duties of administrative authorities as they relate to private interests; means of enforcing decisions; remedies against official action; legal qualifications for office; legal disqualification of officers; appointment, tenure, removal and compensation of officers; and related matters.

[680.] Administrative Law

ASHLEY SELLERS

[820.] Seminar on Problems of Federal Administrative Regulation (1949-50 and alternate years)

THOMAS J. FLAVIN

DIVISION OF PROCUREMENT AND PROPERTY MANAGEMENT

COMMITTEE ON PROCUREMENT AND PROPERTY MANAGEMENT

JAMES SCAMMAHORN, Assistant Director, Office of Budget and Finance, USDA (Chairman)

SIDNEY ADAMS, LL.B., Administrative Officer, Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, USDA

WILLIAM E. FEE, LL.B., Assistant Chief, Administrative Services Division, Soil Conservation Service, USDA

CLIFTON E. MACK, LL.B., Director, Bureau of Federal Supply, Treasury Department

CHARLES E. OFFUTT, Assistant to the Administrator, Production and Marketing Administration, USDA

S. A. SNYDER, Deputy Director, Stores Branch, Bureau of Federal Supply, Treasury Department

RAY WARD, A.B., Assistant Chief, Management Improvement Branch, Division of Administrative Management, Bureau of the Budget

637. Management of Governmental Purchasing

Fall, 2 credits

JAMES SCAMMAHORN

An advanced course designed for employees interested in becoming acquainted with the broad phases of handling and managing Government purchasing activities. Arranged to be especially useful to employees engaged in budget and personnel activities who need some general knowledge of procurement office functions. Deals with purchasing policies, organization and management, finances, and laws governing purchasing. Topics: (1) Organization and management of purchasing offices; (2) organization and management of warehouses; (3) property accounting, management and distribution of supplies and equipment; (4) management and training of purchasing and warehousing personnel; (5) procurement function efficiency determination; (6) importance of project service objective and its relation to good Government purchasing and warehousing; (7) nature of public contracts as compared with private contracts; (8) specification studies including development and writing; (9) delivery requirements, inspection of supplies and liquidated damages; (10) market analysis and conditions which affect seasonal project work of Government bureaus; (11) laws which affect procurement contracts such as Walsh-Healy Act, Davis-Bacon Act, Eight-Hour Law; (12) functions of General Accounting Office, Bureau of Federal Supply, Federal Prisons Industries and surplus disposal agencies in the purchasing scheme; (13) shipping point problems and transportation studies on methods of shipment; (14) new developments in procedures affecting purchasing and dissemination of information to field purchasing units. *Prerequisite:* One of the following: Introduction to Public Administration; Federal Purchasing Procedure; Grade CAF-4 or above in purchasing work; 60 semester hours of college work.

[549.] Property Management (1949-50 and alternate years)

RAY WARD, WILLIAM A. MCCUTCHEON and GEITH G. BARR

DIVISION OF ACCOUNTING**COMMITTEE ON COMMERCIAL AND GOVERNMENTAL ACCOUNTING**

WILLIAM H. ROWE, M.S., Chief, Program Development Division, Federal Crop Insurance Corporation, Production and Marketing Administration, USDA (Chairman)

PAUL L. APPELMAN, Examiner in Accounting, Civil Service Commission

WARNER H. HORN, M.B.A., Chief, Accounting and Rates Division, Civil Aeronautics Board

CHARLES N. MASON, M.A., Assistant Chief, Budget Division, Budget and Management Branch, Production and Marketing Administration, USDA

ROBERT W. MAXWELL, M.A., Commissioner of Accounts, Bureau of Accounts, Treasury Department

HERSCHEL C. WALLING, M.B.A., Principal Budget Examiner, Bureau of the Budget

The Graduate School is interested in offering accounting courses primarily as a means of training for the *public* service.

The curriculum necessarily includes courses in general accounting because the basic principles are essential for Government accounting. The scope of accounting in the Federal service is wide. There are increasing demands for accountants having a knowledge of commercial as well as Government accounting. These demands have come as a result of the formation of many Government corporations and Federal regulatory agencies. Hence, the accounting program required for a Certified Statement of Accomplishment is broad

enough to cover not only the regular appropriation accounting of the Federal Government, but also the accounting training needed for many other governmental activities. The program is comprehensive enough to meet both advanced training for the Government service, and also, if courses are carefully selected, the usual educational requirements for C.P.A. examinations. Students planning to take C.P.A. examinations should know the requirements of the state in which they plan to take the examination. In general, their study, in addition to accounting, should include the following: Principles of Economics, Corporation Finance, Investments, Mathematics of Finance, Business Law, Statistics, Business English, Principles of Marketing and Industrial Management.

CERTIFIED STATEMENT OF ACCOMPLISHMENT IN ACCOUNTING

Requirements

1. High-school diploma or equivalent.
2. Thirty-six semester hours of credit in courses outlined below and distributed as follows:
 - a. All of the required courses.
 - b. No less than three semester hours credit from the Accounting Elective Courses.
 - c. No less than six semester hours credit from the Related Elective Courses.
 - d. The remaining six semester hours credit may be taken in either of the two elective groups.

REQUIRED COURSES

<i>Accounting</i>	<i>Number of Semesters</i>	<i>Semester Hours Credit</i>
Principles of Accounting	2	6
Intermediate Accounting	2	6
Cost Accounting	1	3
Auditing	2	4
Advanced Accounting Problems	1	3

ACCOUNTING ELECTIVE COURSES

Federal Government Accounting	1	3
Federal Tax Accounting	1	3
Analysis and Interpretation of Financial Statements	1	2
Mathematics of Finance	1	3
Federal Accounting Procedure	1	2
Federal Auditing Procedure	1	2
or Advanced Federal Auditing Procedure	1	2
Budgetary and Financial Administration	2	4
Accounting Problems of Regulatory Agencies	1	3
Advanced Accounting Problems (Second Semester) ..	1	3
Accounting Systems	1	2

RELATED ELECTIVE COURSES

Business Law	2	4
Principles of Economics	2	6
Principles of Statistical Analysis	2	6
Writing Procedures and Instructions	1	2
or Writing for Official Purposes	1	2

352^a. Principles of Accounting—First Half

Fall, 3 credits. Repeated in Spring and Summer

WILLIAM L. DYE
HERBERT G. MARSHALL
WILLIAM H. ROWE

Elementary principles of accounting; discussion and problems. At the end of the semester students will be prepared to do the accounting necessary for a small business organization; i.e., keep a complete set of books, draw up statements at the end of the fiscal period, adjust the accounts for accruals, deferred items, depreciation, etc., and close the books. *Prerequisite:* High school graduation or equivalent.

352^b. Principles of Accounting—Second Half

Fall, 3 credits. Repeated in Spring and Summer

WILLIAM L. DYE
HERBERT G. MARSHALL
WILLIAM H. ROWE

Continuation of first half covering more advanced principles of accounting; accounting for partnerships, corporations and manufacturing; depreciation policies and analysis of financial statements. *Prerequisite:* First half or equivalent.

353^a. Intermediate Accounting—First Half

Fall, 3 credits

WARNER H. HORD

Advanced principles of manufacturing accounting, corporation accounting, and valuation as applied to current assets, fixed assets, intangibles, and liabilities, reserves and funds, installment sales. *Prerequisite:* A first year course in accounting.

353^b. Intermediate Accounting—Second Half

Spring, 3 credits

WARNER H. HORD

Advanced principles of partnership accounting, including formation, operation, and dissolution; joint ventures; consignments; agencies and branches; consolidated balance sheets and income statements; application of funds; accounting for insolvent and bankrupt concerns; estates and trusts. *Prerequisite:* First half or equivalent.

422. Business Law

Year, 2 credits each semester *

ELMER MOSTOW

Aspects of law essential to the conduct of modern business. Forms of business organization, bailments, property, sales, mortgages, negotiable instruments, contracts. *Prerequisite:* Principles of Economics, Intermediate Accounting or equivalent.

423. Mathematics of Finance

Spring, 3 credits

RALPH R. BOTTS

Calculation of compound interest, compound discount, sum of annuities, present value of annuities and perpetuities; accumulation of sinking funds and amortization of debts by installments. Calculation of bond yields, bond values, premiums and discounts. Computation of depreciation by sinking fund method and fixed percentage of book value method. Some study is given to life proba-

* This course is so arranged that students may attend both semesters or either semester. No subject matter, however, will be repeated.

bilities and the computation of premiums and reserves for the more common types of life insurance and annuities. Accounting applications and entries will be discussed for those students interested in the accounting aspects.

354. Federal Government Accounting

Fall, 3 credits. Repeated in Spring

CHARLES N. MASON

A review of the development of the accounting system for Federal funds and the present financial organization in which the accounting is performed with attention to the accounting responsibilities of each segment of the organization, including the Treasury Department and the General Accounting Office. Detailed study is given to the accounting problems of administrative agencies with special emphasis on general ledger controls and financial reporting problems. *Prerequisite:* One year of Principles of Accounting, or Federal Accounting Procedure and one semester of Principles of Accounting or equivalent.

510. Analysis and Interpretation of Financial Statements

Fall, 2 credits

LAURENCE W. ACKER

Study of the flow or movement of funds as reflected in the financial statements. Use of ratios and other indices in the analysis and interpretation of financial position together with a consideration of trends and variations therein. Subject matter is developed through lectures and problems, supplemented with published financial statements. Each student prepares, under supervision of the instructor, an analysis of the current financial statements of some prominent corporation together with a comparison with the principal competitors in the field. *Prerequisite:* Intermediate Accounting.

[642.] Cost Accounting

ALFRED D'ALESSANDRO

645. Federal Tax Accounting

Fall, 3 credits

EUGENE C. MOYER

Federal taxation presented from the accounting viewpoint. Special attention given to income taxation. *Prerequisite:* Principles of Accounting; accounting experience desirable.

693. Auditing

Year, 2 credits each semester

JOHN C. COOPER

The fall semester is devoted to the study of the fundamental principles of public or commercial-type audits. Consideration is given to the purposes and types of audits; the responsibility of the auditor; planning and performing audits. Special emphasis is placed on problems in audit theory and practice such as are generally given in C.P.A. examinations.

In the spring semester, emphasis is placed on case studies in auditing and the application of audit principles. Special consideration is given to the field of internal audit as a tool of management and the utilization of internal audit in Government. *Prerequisite:* Intermediate Accounting.

[646.] Advanced Accounting Problems

LAURENCE W. ACKER

695. Accounting Systems

Spring, 2 credits

LAURENCE W. ACKER

Classification of accounts. Planning, designing and installation of accounting systems. Problems of management. Organization and correlation of accounting department with other departments. Illustrative systems, showing forms and procedures for specific types of business, including financial institutions, insurance, department store, public utilities and Government. *Prerequisite:* Intermediate Accounting.

Department of Social Sciences

DEPARTMENTAL COMMITTEE

FREDERICK V. WAUGH, Ph.D., Economist, Council of Economic Advisers, Executive Office of the President (Chairman)

ROGER B. CORBETT, Ph.D., Associate Dean and Associate Director, College of Agriculture, University of Maryland

FOSTER F. ELLIOTT, Ph.D., Associate Chief, Bureau of Agricultural Economics, USDA

H. DUNCAN HALL, B.Litt., British Official War Histories

SHERMAN E. JOHNSON, Ph.D., Assistant Chief for Production Economics, Bureau of Agricultural Economics, USDA (Vice-chairman)

JOHN PROVINSE, Ph.D., Assistant Commissioner, Bureau of Indian Affairs, Department of Interior

HAROLD B. ROWE, Member, Senior Staff, Brookings Institution

J. MURRAY THOMPSON, Ph.D., Chief, Economic Division, Price Support and Foreign Supply Branch, Production and Marketing Administration, USDA

PAUL WEBBINK, A.B., Staff Member, Social Science Research Council

PURPOSE AND SCOPE

Social science deals with people and the problems of human relationships, as contrasted with natural or physical science which deals with things and the problems arising out of physical relationships.

The problems of social organization and operation have become both absolutely and relatively more important with the increase in complexity of our industrial civilization. More and more, people are concerned with the organization of production, the distribution of goods and income, and with price policies. The individual as a consumer and investor, the businessman and the farmer as producers, find increasing need for a knowledge of economics and other social sciences. Large corporations are employing growing numbers of economists to help in the formulation of policy. Psychologists and social workers are finding a demand for their services in personnel work. And, the large number of Federal, state and local government agencies need more people adequately trained in social science.

Social science is divided into a number of closely allied fields including economics, sociology, political science, history, law, and psychology. A broad grasp of any one of these subjects implies at least some familiarity with the others, because of the many interrelationships among these studies. Yet the continued development of each social science has given rise to larger and still larger bodies of knowledge relating to it, until only through a considerable degree of specialization can the student hope to master any one part. Thus the great need is for people who have concentrated sufficiently on one phase of a social science, such as marketing in economics, to be thoroughly familiar with the details of fact and principles involved, yet who also have a broad underlying training in the allied fields.

The courses offered by the Graduate School are designed to aid in acquiring a general background in the social sciences, as well as the specialized training in particular fields which is necessary for successful work in many Government departments and in private business. Some courses are included that are of interest outside of a person's field of work or specialization. For example, a course in the Psychology of Human Relations is of interest to all persons who desire a better understanding of human behavior as a basis for their day to day contacts with other people. A course in Managing Personal Finances will be useful to persons who are faced with problems of owning a home, investing current savings, or making decisions with respect to the type of life insurance best suited to their special needs.

But not all of those engaged in occupations connected with the social sciences can hope to attain a complete general as well as specialized background, at least for some time to come. They will be interested, rather, in courses designed to fit them better for doing some specific job which is not connected with research, policy formation or general administration. An employee in the personnel office of a Department of Agriculture branch responsible for market news and inspection services may wish to take a course in marketing in order to learn something about the subject matter dealt with by the personnel of the branch, or a course in psychology as an aid in dealing with the personal problems which are daily presented to employee counselors. The secretary to an economic research director may want a course in the principles of economics in order to become familiar with the terminology and general economic concepts to which her stenographic and filing duties relate. An almost unending array of job needs of this kind offers opportunities to the alert and ambitious employee to increase his capacity and usefulness to his employer. The many promotions within the Government service which can be traced directly to such training testify to the fact that study in the social sciences is profitable.

GROWING NEED FOR TRAINED WORKERS

It is extremely important that Government policies, relating to the economic and social life of the Nation, be based on competent studies of the probable effects of alternative lines of action. To forecast accurately what will happen and to point out clearly the good and bad effects which may result from any proposed course of action is the major service which social scientists may render to the people of this country.

Washington is an excellent place to study problems of this kind. The principal Federal programs in the economic and social fields

are administered in Washington and new proposals constantly are being considered both by the Congress and by the agencies responsible for the administration of those programs. Moreover, Washington is growing in importance as a center for the discussion and actual administration of international programs.

SUGGESTIONS FOR PROGRAM OF STUDY

To meet the specific needs of students who have different educational and experience backgrounds and different immediate interests, the Graduate School has developed the following types of courses in the social sciences:

- (1) *Courses of General Interest.* Several of the social science courses are designed to provide information of general interest to a large group of persons who desire to broaden their background along certain lines. Some of these courses have been developed to meet the needs of persons who do not expect to become specialists in a particular field, but who desire to obtain some background in a subject, as a basis for work in related fields, or purely as a personal interest. The courses that meet the general interest needs of students are usually not of graduate level.
- (2) *Undergraduate Basic Courses.* These courses are designed to provide a basic social science background for students who have not completed their undergraduate training or who have not had an opportunity to take the basic background work in economics and the other social sciences as a part of their qualification for Bachelor's degree work. These courses provide an opportunity for persons who enter the Government service in the lower grades to prepare themselves for professional advancement.
- (3) *Graduate and Advanced Undergraduate Courses.* These courses offer work of graduate level but they are also open to undergraduates of advanced standing. Students who are registered for graduate credit will be expected to do more work in these courses than those who register for undergraduate credit.
- (4) *Strictly Graduate Courses.* These courses are offered only for graduate students who have adequate background. They are usually conducted on a seminar basis and they require a great deal of participation and preparation of material by the students themselves.

The Graduate School does not offer either undergraduate or advanced degrees, but it is possible for a student who is interested in working toward a degree to organize his work in the Graduate School in such a way that he will fulfill some of the requirements of the institution where he expects to obtain a degree. If possible, the course of study should be outlined in consultation with advisers at the institution where the student expects to take his degree. Students who have not decided on the institution where they expect to complete their work but who wish to specialize in economics or in one of the other social sciences should select basic courses leading toward degree work, in consultation with designated advisers of the Graduate School.

Basic Undergraduate Courses for a Major in Economics. Students working toward a Bachelor's degree with specialization in economics should plan to complete the following courses either in the Graduate School or at some other institution:

- | | |
|---------------------------------------|----------------------|
| 1. Principles of Economics | 3. Economic History |
| 2. Principles of Statistical Analysis | 4. Money and Banking |
| 5. Public Finance | |

In addition to these courses, the students looking forward to concentration of work in agricultural economics should plan to complete undergraduate courses in Economics of Marketing and Economics of Farm Production. An elementary course in accounting should also be included if the student plans to major in prices and marketing. Undergraduate students who expect to major in one of the other social sciences should consult designated advisers in the Graduate School.

Graduate Courses. Students working for graduate degrees should consult educational advisers in the institution where they expect to receive their degree. If they have not selected such an institution they should confer with advisers in the Graduate School who are teaching in the particular field in which they expect to concentrate. In general, students who wish to map out a course of study leading toward a graduate degree should plan their work along the following lines:

- (1) Completion of basic undergraduate courses.
- (2) Advanced courses in social science fields related to the particular field of concentration. For example, a student majoring in economics should consider advanced courses in statistics, economic history, sociology or some other related field in order to broaden his educational background.

(3) Advanced courses in the field of concentration. Students who expect to major in one of the social science fields should begin their graduate work by taking the basic graduate courses in that special field. For example, students who expect to major in any field of economics should plan to take at least six credits of work in advanced economic theory and six credits in monetary and cycle theories. With these courses as a foundation, the student can begin to specialize in courses in his particular field of concentration.

DIVISION OF ECONOMICS

GENERAL ECONOMICS

COMMITTEE ON GENERAL ECONOMICS

MORDECAI EZEKIEL, Ph.D., Head, Agricultural Industrial Relations Branch, Economics and Statistics Division, Food and Agriculture Organization of the United Nations (Chairman)

H. M. DOUTY, Ph.D., Chief, Division of Wage Analysis, Bureau of Labor Statistics, Department of Labor
 EVERETT E. HAGAN, Ph.D., Chief, Section A, Fiscal Analysis Branch, Fiscal Division, Bureau of the Budget
 HOWARD S. PIQUET, Ph.D., Senior Specialist in International Trade, Legislative Reference Service, Library of Congress

STEPHEN RAUSCHENBUSH, B.A., Consultant on International Resources, United Nations
 MARGARET G. REID, Ph.D., Head, Family Economics Section, Research Division, Bureau of Human Nutrition and Home Economics, Agricultural Research Administration, USDA

Adequate foundation training in general economics is essential for satisfactory accomplishment in the study of any specialized branch of the subject. Hence, the primary objective in developing the following list of courses has been that of providing the basic work needed, by students who wish to carry out a systematic plan of study, at both undergraduate and graduate levels. In addition, a course on research methods is listed under this head. It is of general interest to students majoring in economics.

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Course Numbers and Symbols—Below 100, non-credit; 100-399, undergraduate; 400-699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

—O—

110. Introductory Survey of Economics

Summer, 2 credits

BUSHROD W. ALLIN

A refresher course for those for whom a lapse of time has intervened since taking a more complete course in principles and who wish to review the basic principles. Also for those interested in becoming acquainted with the nature and general content of economics as a science and a profession.

200. Introduction to Economics, Theory and Institutions

Fall, 2 credits

BUSHROD W. ALLIN

This course is largely a study of the place of collective action in economic theory. Institutions are defined as collective action in control of individual action. These take the forms of corporations, trade unions, farm organizations and decisions of the Supreme Court. Theory is interpreted as referring to mental tools useful for understanding and dealing with contemporary economic and social problems.

201. Principles of Economics

Year, 3 credits each semester

ROY J. BURROUGHS

An introductory course designed to equip the student with the basic tools of economic analysis and with an understanding of the more important institutions of the economic system including the individual business firm and the banking system. Economic problems are approached from two points of view: (1) the neo-classical, involving operations of the price mechanism, behavior of individual consumers, business firms and industries and the interrelations within the economy including the allocation of resources and the distribution of the total product to the factors of production; (2) the modern "aggregative" approach emphasizing total effective demand and such general concepts as total employment, national income and wealth, and savings and investments.

480. Money and Banking

Year, 2 credits each semester

ALLAN G. B. FISHER and JOHN K. HORSEFIELD

The principles of money. The value of money. Effects of changing price levels. Money, credit, and capital. Significance of the rate of interest. Fundamentals of monetary policy. Evolution of the banking system. The money-market. Principles of Central Banking. The Federal Reserve System. Quantitative and qualitative credit control. Banks and the creation of credit. Effects of the war on the banking system. Inflation and deflation. International monetary standards. International monetary relations. *Prerequisite:* Principles of Economics or equivalent.

418. Public Finance and Taxation

Spring, 2 credits

TYLER F. HAYGOOD

Government revenues, expenditures, debts, financial administration and fiscal policy; taxation; equity in distribution of tax burdens, shifting and incidence of taxation; types of taxes, excise, income, property, excess profits, etc. *Prerequisite:* A course in economics.

610. Advanced Economic Theory

Fall, 2 credits (alternate years)

L. A. MORRISON

A critical and comparative review of different systems of economic theory. A seminar for advanced students, interested in economic theory, who have already done substantial work in economics. Attention first is given to the pre-conceptions and nature of English classical economics with reference primarily to John Stuart Mill. Thereafter discussion is directed to critical consideration of the theoretical systems of Karl Marx, Jevons, the Austrian School, Alfred Marshall and J. B. Clark. In the final meetings discussions will deal with more recent developments in formal economic theorizing, particularly with the validity and significance of the emphasis placed on monopoly and imperfect competition by some writers. *Prerequisite:* Elementary and intermediate work in economics.

705. History of Economic Thought

Fall, 3 credits

MAX J. WASSERMAN

The economic theories of the most important schools and economists from Greek antiquity through Alfred Marshall (1895). The schools covered are the Greek, Medieval Period, Mercantilism, Physiocrats, the Classical School, Socialism of 1848, Historical School, Psychological School and the Neo-Classical School. The theories studied are projected against the factual and philosophical background of the period. *Prerequisite:* Principles of Economics or equivalent.

741. Contemporary Economic Thought

Spring, 3 credits

BUSHROD W. ALLIN

A review of the ideas of the leading economic theorists of the past fifty years, including those of Marshall, Veblen, Commons, Mitchell and Keynes. *Prerequisite:* Principles of Economics or equivalent.

711. Imperfect Competition and Public Regulation

Year, 3 credits each semester

MICHAEL T. WERMEL

First semester: Critical re-examination of basic premises and underlying theories of competitive price determination; intensive study of newer theoretical techniques for the analysis of pricing under conditions intermediate between "perfect competition" and "pure monopoly" described recently as conditions of "monopolistic" or "imperfect" competition. Study of extent of limitations on competition and of concentration of private control in the American economy and of actual institutional practices of price determination in specific markets in industries characterized by imperfect competition, such as rubber tires, agricultural implements, drugs, meat packing, fertilizers, automobiles, canning, etc.

Second semester: Appraisal of objectives, methods, and achievements of public efforts to deal with imperfect competition and monopoly, including Food and Drugs Act and fair trade laws, anti-trust acts and enforcement, cartel controls, public utility regulation, encouragement of competition from cooperatives, "yardstick" competition by publicly-owned undertakings, etc. Officials of the Anti-Trust Division, I.C.C., Federal Trade Commission, T.V.A., Federal Communications Commission, state and local utility commissions, and of other regulatory agencies will be invited to present and discuss their objectives, achievements, and problems. *Prerequisite:* Training in economics or equivalent in general experience subject to approval of instructor.

703. Modern Theories of Business Fluctuations

Spring, 2 credits

WILLARD W. COCHRANE

Modern theories of employment, output, and prices, including those of Hansen, Keynes, Robertson, Lange, and the Stockholm group, are analyzed with some attention given to the early development of these theories together with their present day criticisms. The theories of each school are analyzed with respect to (1) inner consistency, and (2) contribution to an explanation of variations in the level of employment, output, and prices in the operating economy. A synthesis of the theories listed and the possibility of effecting a fusion with "orthodox" economic theory are explored, and policy implications examined. *Prerequisite:* A course in money and banking at the advanced undergraduate level and a course in advanced general economics, or equivalent as approved by the instructor.

[528.] International Financial and Trade Policies (1949-50 and alternate years)

OSCAR ZAGLITS

[728.] Seminar in International Financial and Trade Policies (1949-50 and alternate years)

OSCAR ZAGLITS

[704.] Economic Theory of International Trade

H. J. WADLEIGH

[402.] Measurements of Economic Activity (1949-50 and alternate years)

LOUIS H. BEAN and SPECIAL LECTURERS

[712.] Research Methods in Social Sciences (1949-50 and alternate years)

O. C. STINE and SPECIALISTS

AGRICULTURAL ECONOMICS**COMMITTEE ON AGRICULTURAL ECONOMICS**

SHERMAN E. JOHNSON (Chairman)

HAROLD HEDGES, M.A., Chief, Cooperative Research and Service Division, Farm Credit Administration, USDA
 HAROLD B. ROWE
 J. MURRAY THOMPSON

ORIS V. WELLS, B.S., Chief, Bureau of Agricultural Economics, USDA
 BENNETT S. WHITE, Ph.D., Chief, Division of Marketing and Transportation Research, Bureau of Agricultural Economics, USDA

The great importance of enlarging and improving knowledge of the economics of agriculture is generally recognized. Constructive accomplishment in this field requires thorough training in economics combined with a comprehensive grasp of its application to the special conditions of agriculture. Such a balanced combination can best be achieved by following a systematic course of study appropriate to the particular area of concentration desired. The courses offered by the Graduate School permit students to carry out such plans of study with concentration in the economics of agricultural production, agricultural finance, prices, and marketing. The electives and general interest courses provided also permit the adaptation of study plans to meet the special interests of individual students.

Shortage of well-trained marketing personnel, at both Federal and State levels, critically handicaps developing a well-rounded program under the Agricultural Research and Marketing Act. The greatest immediate need is for men with advanced training who can undertake independent work in new fields. The broad expansion of activities scheduled under the Act also will continue and intensify the need for adequately prepared college graduates. On both problems the Department of Agriculture is cooperating closely with land-grant institutions. Joint committees have analyzed and mapped out attack on these problems. As part of this plan the Graduate School has given special advanced training to Washington personnel engaged in marketing work, and this year provides its full complement of regular courses in this field, including those scheduled normally to be given in alternate years.

**CERTIFIED STATEMENT OF ACCOMPLISHMENT IN
AGRICULTURAL ECONOMICS**

The Graduate School offers a Certified Statement of Accomplishment to students who have completed 30 credits of graduate work in agricultural economics, including the basic graduate courses in economics. To qualify, it is necessary to follow the specific sequence of courses that are listed for three fields of concentration indicated below.

The Certified Statement of Accomplishment is not an advanced degree, but it constitutes evidence of completion of an organized course of study in the field of agricultural economics. It is a certification that the student has completed a program of study which prepares him for effective public service in agricultural economics work. The Graduate School plans to extend the granting of Certified Statements of Accomplishment to other social science fields as there is sufficient demand.

**COURSES LEADING TO CERTIFIED STATEMENT OF ACCOMPLISHMENT
IN AGRICULTURAL ECONOMICS**

(With Concentration in Specified Fields of Application)

<i>Economics of Production</i>	<i>Agricultural Finance</i>	<i>Prices and Marketing</i>
BASIC UNDERGRADUATE COURSES		

Required foundation courses. Carry undergraduate credit only and may not be used to meet the credit hour requirement for the certified statement. Equivalent courses will be accepted by transcript from other institutions.

The number in parenthesis after course title indicates semester hour credits.

Principles of Economics (6)	Principles of Economics (6)	Principles of Economics (6)
Principles of Statistical Analysis (4)	Principles of Statistical Analysis (4)	Principles of Statistical Analysis (4)
Economics of Farm Production (3)	Economics of Farm Production (3)	Economics of Farm Production (3)
Introduction to Marketing (3)	Introduction to Marketing (3)	Introduction to Marketing (3)

REQUIRED BASIC GRADUATE COURSES

Advanced Economic Theory (6)	Advanced Economic Theory (6)	Advanced Economic Theory (6)
Money and Banking (4)	Money and Banking (4)	Money and Banking (4)

REQUIRED SPECIALIZED GRADUATE COURSES

Farm Management (2) or Land Economics (4)	Agricultural Finance (3)	Economics of Marketing (4)
Seminar on Agricultural Policies (2)	Farm Management (2) or Land Economics (4)	
Seminar in Economics of Production (3)	Seminar in Agricultural Finance (3)	Seminar on Agricultural Policies (2) Seminar in Marketing (3)

ELECTIVE GRADUATE COURSES

Select courses in consultation with Graduate School advisers to complete the 30 graduate credits required for certified statement of accomplishment.

[205.] Introduction to Farming (1949-50 and alternate years)

HARRISON M. DIXON and STAFF

207. Economics of Farm Production

Fall, 3 credits (alternate years)

KENNETH L. BACHMAN

Designed to develop the economic principles of production and to relate these principles to practical farm problems; including their application in the determination of the proper combination of production resources, the selection of enterprises and the explanation of variation in agricultural production in different areas. A brief survey of the application of such principles in achieving optimum production.

409. Farm Management

Spring, 2 credits (alternate years)

WYLIE D. GOODSELL

An advanced course in farm organization and management which combines development of economic principles of farm production with practical application to the planning and operation of farms of different types, sizes, and locations. The practical and theoretical aspects of purchasing, organizing, operating, and managing farms are treated. Consideration is given also to economic adjustments needed in specific farming areas and for the nation. *Prerequisite:* Economics of Farm Production, or equivalent.

[410.] Land Economics (1949-50 and alternate years)

V. WEBSTER JOHNSON

[411.] Agricultural Finance (1949-50 and alternate years)

DONALD C. HORTON

[412.] Risk and Insurance (1949-50 and alternate years)

WILLIAM H. ROWE

[475.] World Agriculture

R. G. HAINSWORTH, C. M. PURVES, and CLAYTON E. WHIPPLE

720. Seminar in Economics of Production

Spring, 3 credits (alternate years)

SHERMAN E. JOHNSON and ASSOCIATES

A seminar dealing with special problems in the broad field of economics of production. Students will be expected to prepare papers on problems of interest in their special fields. Different research workers and administrators participate in the discussion of current problems under the guidance and coordination of the instructor. *Prerequisite:* Background of graduate work and approval of instructor.

RESOURCE UTILIZATION AND CONSERVATION

COMMITTEE ON RESOURCE UTILIZATION AND CONSERVATION

HORACE R. JOSEPHSON, Ph.D., Assistant Chief, Division of Forest Economics, Forest Service, USDA (Chairman)

CARLETON P. BARNES, Ph.D., Chief Analyst, Soil Uses and Productivity, Division of Soil Survey, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA
ERNEST G. HOLT, Research Specialist, Soil Conservation Service, USDA

V. WEBSTER JOHNSON, Ph.D., Chief, Division of Land Economics, Bureau of Agricultural Economics, USDA

ERNEST H. WIECKING, M.A., Office of the Secretary, USDA

LECTURES ON RESOURCE UTILIZATION AND CONSERVATION

Resources in a World of Conflict
Oil and National Security
The Soils Men Live By
Water: A Problem on Conservation
Potentialities of the Tropics

These are a partial list of topics to be included in the 1948-49 lecture series dealing with major conditions, problems, and policies arising in the resource field. Lecturers will be nationally known authorities in this field.

No registration will be required and no fees charged. Lectures will be given at 4:30 in the Jefferson Memorial Auditorium. A special announcement of each lecture in this series will be made to employees in the Department of Agriculture. While these lectures are designed primarily for this group, others interested in special topics may make arrangements through the Registrar's office.

719. Seminar in Resource Utilization and Conservation

Year, 2 credits each semester (alternate years)

V. WEBSTER JOHNSON and HORACE R. JOSEPHSON

A seminar in conditions, problems, and public policies in the utilization and conservation of natural resources, with particular emphasis on current issues. Discussions cover agricultural land, forests, water resources, petroleum, strategic minerals, and other important natural resources. Integrated topics dealing with river basin development, utilization of tropical resources, population in relation to resources, and similar subjects. The lecture series on Resource Utilization and Conservation is offered in conjunction with this course, and speakers in this series will be invited to lead discussions in the seminar. *Prerequisite:* Graduate work in related areas, or experience as approved by instructors.

[721.] Seminar in Agricultural Finance (1949-50 and alternate years)

NORMAN J. WALL and RUSSELL C. ENGBERG

203. Introduction to Marketing

Fall, 3 credits (alternate years)

BENNETT S. WHITE

A preliminary course intended to provide orientation for the study of marketing as (1) a type of production which supplies essential services, and (2) a valuation process in which the prices of agricultural commodities are established. Marketing machinery costs, functions, methods and practices are surveyed. Marketing specialists of the Department of Agriculture will lead discussions relating to particular commodities and special problems. *Prerequisite:* Principles of Economics or the equivalent.

414. Economics of Marketing

Year, 2 credits each semester (alternate years)

H. M. SOUTHWORTH and HARRY C. TRELOGAN

An advanced course in which economic aspects of marketing agricultural commodities are systematically analyzed, with main emphasis on applying modern economic concepts to the successive problem areas developed. The first semester considers marketing, including transportation, storage, processing, and distribution, as a process of production. It explores the use of resources in this production, the effects of market institutions and organizations upon the use of resources and the productive services performed, and the criteria of efficiency of this productive process and of public policy designed to improve it. The second semester considers the market as a mechanism for establishing prices. It explores the functions of market prices, the process of price-making, the effects of market organization and practices, and the relationships between margins and the costs of productive services in marketing, and the criteria of efficiency in price-making and of public measures that regulate or intervene in the price-making process. *Prerequisite:* General background in economics and Introduction to Marketing, or its equivalent as approved by instructor.

530. Methods of Price Analysis

Year, 2 credits each semester (alternate years)

RICHARD O. BEEN and ROBERT M. WALSH

A general survey of the main price problems in agriculture and in marketing and consumption of farm products; a critical analysis of recent developments in economic theory and in statistical techniques and their use to measure the effects of various factors influencing prices; and a study of the accuracy and usefulness of price forecasts. Special attention will be given to Government price, production and marketing programs; to speculation and futures trading; and to trade practices and market organization as they affect the prices of farm products at various stages in the marketing process. Emphasis will be placed on developing proficiency in application of price analysis methods. *Prerequisite:* Principles of Economics and a course in elementary statistics which has included correlation analysis. Course may be entered second semester with instructor's consent.

722. Seminar in Marketing

Spring, 2 credits (alternate years) FREDERICK V. WAUGH and WILLIAM C. CROW

A seminar for advanced students professionally interested in the organization of markets and market agencies (firms) in relation to adequacy of service, efficiency and costs. Chief emphasis will be placed upon application of analytical methods of economics, accounting and statistics to important problems and policy questions in this field. Credit will be awarded on the basis of papers submitted on the special subjects approved at time of registration. *Prerequisite:* Registration upon instructor's approval of topic selected by the student for special study.

750. Seminar on Prices

Fall, 2 credits (alternate years)

ORIS V. WELLS

For advanced students professionally interested in analysis of the determination and behavior of agricultural prices. Chief emphasis is placed on price research and its application to agricultural policy. Includes price spreads, margins, and charges for agricultural commodities and associated services. Credit will be awarded on the basis of papers submitted on the special subjects approved at the time of registration. *Prerequisite:* Graduate work in economics of marketing or comparable experience as approved by instructor.

407. History of Agricultural Policy in the United States Since the Colonial Period

Year, 2 credits each semester

EVERETT E. EDWARDS

An introductory historical survey of agricultural policies in the United States; the relation of agricultural policy to the main currents of American thought; the principal forces shaping agricultural policies in past periods; and the inter-relationships among agricultural and other economic and social policies.

[416.] **Agricultural Cooperation** (1949-50 and alternate years)
HAROLD HEDGES and A. REX JOHNSON

[716.] **Seminar on Agricultural Policies** (1949-50 and alternate years)
WILLIAM A. MINOR and ORIS V. WELLS

[718.] **Seminar in Rural Social Policies** (1949-50 and alternate years)
T. J. WOOFTER

COOPERATIVE EXTENSION EDUCATION

COMMITTEE ON COOPERATIVE EXTENSION EDUCATION

CANNON C. HEARNE, M.S., In Charge, Training Section, Division of Field Studies and Training, Extension Service, USDA (Chairman)

ARTHUR L. DEERING, Sc.D., Director, Agricultural Extension Service, University of Maine

GLADYS G. GALLUP, Ed.D., Assistant Chief, Division of Field Studies and Training, Extension Service, USDA

DOUGLAS ENSMINGER, Ph.D., Social Scientist, Division of Farm Population and Rural Life, Bureau of Agricultural Economics, USDA

MEREDITH C. WILSON, B.S., Chief, Division of Field Studies and Training, Extension Service, USDA

Cooperative extension education consists of the off-campus, non-resident teaching service of the land-grant institutions in cooperation with the USDA and the leadership of a county. It is the largest non-school educational program in the United States. The growing interest on the part of county agents, supervisors, specialists, and administrators in cooperative extension work as a profession has led the Graduate School to appoint a committee on Cooperative Extension Education. This committee has the responsibility for giving guidance to students toward a program best suited to the individual's needs, within the framework of the Graduate School. This program may well lead to an advanced degree depending upon the plans of the student and the cooperative arrangements available through the Graduate School. A separate leaflet is available describing the courses listed below, which will be given as the demand justifies, and showing also a general framework of courses of interest to cooperative extension people.

450. Methods and Techniques

2 credits

GLADYS G. GALLUP and OTHERS

596. Development of Programs

2 credits

CANNON C. HEARNE

535. Basic Evaluation, Research Methods and Techniques

2 credits

LAUREL K. SABROSKY, FREDERICK P. FRUTCHEY and OTHERS

620. Administration and Supervision

2 credits

M. C. WILSON

695. Problems in Cooperative Extension Education

6 credits

CANNON C. HEARNE

CONSUMPTION ECONOMICS

Consumption economics is concerned with the interrelationships of production and distribution of income with the kind and quantity of consumption goods and their distribution. Special attention is given to conditions that maximize consumer knowledge and freedom of choice and to factors affecting the distribution of consumption goods, especially income and savings and their distribution, place of residence and type of consuming unit and additional factors such as price advertising, standardization and informative labels. Customs, legislation and social organization of various types, and their effect on consumption, receive special attention.

[300.] Marketing from Consumer's Point of View (1949-50 and alternate years)

H. M. SOUTHWORTH

325. Managing Personal Finances

Fall, 2 credits. Repeated in Spring HARALD C. LARSEN, assisted by RALPH R. BOTTS and RALPH F. KOEBEL

Renting versus owning a home; costs of home ownership; methods and mathematics of financing; characteristics of deed, abstract, mortgage, trust, contract, and notes; financing durable and other consumer goods; sources and costs of consumption credit and installment buying; characteristics of major types of investments, stocks, bonds, debentures, mortgages, notes, savings accounts, and property; provisions for retirement, Federal retirement system and options, social security and other retirement systems. Insurance: choosing a company, features of principal life insurance and annuity contracts, protection versus savings, nonforfeiture privileges, settlement options, and property, liability and other insurance programming. Planning and administration of estates, joint ownership, laws of intestacy, making a will, administration of estates as executor or administrator, proof of will, costs and fees.

[419.] Standards of Living (1949-50 and alternate years)

ISABELLE M. KELLEY

[521.] Economics of Food (1949-50 and alternate years)

MARGARET G. REID

[445.] Consumer Cooperation (1949-50 and alternate years)

VALERY J. TERESHTENKO

HEALTH AND MEDICAL SERVICES

COMMITTEE ON HEALTH AND MEDICAL SERVICES

RAYMOND C. SMITH, M.S., Assistant Chief for Farm Population, Bureau of Agricultural Economics, USDA (Chairman)

ELIN ANDERSON, M.A., Specialist in Rural Health Services, Extension Service, USDA
NELSON H. CRUIKSHANK, A.B., Director, Social Insurance Activities, American Federation of Labor

FRANZ GOLDMANN, M.D., Associate Professor of Medical Care, School of Public Health, Harvard University

MARGARET C. KLEM, B.A., Chief, Medical Economics Section, Division of Health and Disability Studies, Bureau of Research and Statistics, Social Security Administration, Federal Security Agency

T. WILSON LONGMORE, M.A., Social Scientist, Division of Farm Population and Rural Life, Bureau of Agricultural Economics, USDA

MILTON I. ROEMER, M.D., Surgeon, Associate in Medical Care Administration, States Relations Division, U. S. Public Health Service, Federal Security Agency

MARIE E. WALLACE, B.S., Chief, Nursing Operations, Federal Employees Health Division, U. S. Public Health Service, Federal Security Agency

MARK V. ZIEGLER, M.D., Chief Medical Officer, Farmers Home Administration, USDA

The wide-spread interest in improving the organization and administration of health and medical services is well illustrated by the growth of prepayment plans for medical care, such as those in industry and those sponsored by consumer and professional groups, and by active discussion of proposals for a comprehensive national health service. Developments such as these have focused attention on the need, in areas both of governmental and voluntary activity, for greater emphasis on exchange and dissemination of information and experience among those in this field, and for equipping personnel now in or preparing to enter this work with information and techniques essential to effective operation. The courses listed below reflect, along one line, the efforts of the committee listed above to make such provision for personnel in both governmental and voluntary agencies in the Washington area. It is also anticipated that experience and materials developed through this program will be of considerable value to other institutions interested in providing such educational opportunities.

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460. Introduction to Medical Economics

Spring, 2 credits

MARGARET C. KLEM and SPECIALISTS

A review of the economic status of the population; indications of unmet needs for health services: death rates, prevalence and duration of illness, results of physical examinations in selected population groups, receipt of medical care, comparison of care received with estimates of adequacy, expenditures for medical care including a summary of the outlays by government, industry, philanthropy and consumers and the uneven burden of consumer medical costs; distribution of health personnel and facilities and incomes of hospitals and health personnel; utilization of health facilities; various insurance programs for hospital and medical service; summary of public opinion and proposals for improving distribution of medical care. *Prerequisite:* Elementary courses in social science, or equivalent experience as approved by instructor.

[540.] Health Service Programs (1949-50 and alternate years)

MARGARET C. KLEM, ELIN ANDERSON and SPECIALISTS

770. Seminar on Health Service Programs

Fall, 2 credits (alternate years)

MARGARET C. KLEM and MILTON TERRIS

The principles of health planning; evaluation of present and pending health legislation; administrative problems and techniques; professional participation and community organization for improving health services. The particular interests of the students will determine major emphases of the seminar. This year special emphasis will be given to a discussion of the thirteen points covered by the National Health Assembly. *Prerequisite:* Introduction to Medical Economics or equivalent experience as approved by instructor.

PUBLIC HEALTH NURSING

To provide increased educational opportunities for nursing personnel employed in Federal Agencies, the School of Nursing Education of the Catholic University of America and the Graduate School of the Department of Agriculture cooperatively offer the courses listed below.

These courses carry resident credit at the Catholic University of America and are those offered in the program approved by the National Organization for Public Health Nursing. These courses, and others which are taken at the Graduate School of the Department of Agriculture and are the equivalent of required academic courses at the School of Nursing Education, may be offered in partial satisfaction of requirements toward a Bachelor of Science degree at the Catholic University of America.

551. Public Health Nursing

Fall, 3 credits

(To be announced)

An introduction to the field of nursing in public health, and a consideration of its history, basic principles, general responsibilities of the nurse and trends.

555. Principles and Methods of Teaching as Applied to Public Health Nursing

Fall, 3 credits

(To be announced)

A study of principles and methods of teaching as applied to public health nursing. This includes emphases upon the early recognition of learning opportunities and effective use of them for the promotion and development of individual, family and community health. Students will be expected to work out teaching plans for group instruction to be used with expectant parents and other adult groups. *Prerequisite:* General Psychology.

It is recommended that students take English, Psychology and Sociology before pursuing further courses in the professional field.

LABOR ECONOMICS

The field of labor economics has been an area of considerable research and thoughtful analysis. All persons in the community are deeply affected by labor problems, yet there is a great need for a more widespread comprehension of the data and experiences well known to labor economists. Government employees in most agencies can also increase their effectiveness through a knowledge of the labor implications of their operations. The following courses are designed to meet such needs—by presenting a body of significant information, the evaluation of scholars, and the techniques of administrators in this vital area of economic relations.

305. Introduction to Labor Problems

Fall, 2 credits

MOLLIE RAY CARROLL

A survey course presenting salient facts indispensable to an understanding of the major problems of industrial workers: wages, hours, and plant conditions; productivity and technological progress; job security and unemployment; special problems of marginal workers (women, children, migrants, convicts, etc.). Also a review of the approaches to these problems made by employers, unions, and Government.

[320.] Economics of Labor Standards

[330.] Trade Union Movement: Organization

[425.] Trade Union Movement: Policies and Procedures

[455.] Fundamentals of Social Insurance

[403.] Labor and Social Legislation Abroad

760. Government and Labor Problems

Year, 3 credits each semester (alternate years)

WILLIAM GROGAN

First semester: The functioning of law and Government agencies in the field of labor standards. Analysis of statutes and judicial decisions on minimum wages; wage payment and collection; maximum hours; employment of women, children, prisoners, and immigrants; home work; industrial accidents and diseases; vocational training; and employment agencies. Attention will be given to the administrative problems of state and Federal agencies and to the work of the International Labor Organization.

Second semester: The functioning of law and Government agencies in the field of labor relations. Analysis, through case situations, of statutes and judicial decisions on organizations of trade unions, the incidents of union membership, collective bargaining, strikes and lockouts, picketing, boycotts, blacklists, conciliation and arbitration, and trade union responsibility. Attention will be given to administrative procedures of the National Labor Relations Board and the state labor relations boards. *Prerequisite:* Introduction to Labor Problems and general undergraduate work or equivalent.

[456.] Economics of Collective Bargaining (1949-50 and alternate years)

DAVID ZISKIND

[594.] Settlement of Labor Disputes

DAVID ZISKIND

DIVISION OF INTERNATIONAL RELATIONS

COMMITTEE ON INTERNATIONAL POLICIES AND PROBLEMS

H. DUNCAN HALL (Chairman)

STANLEY K. HORNBECK, Ph.D., former Chief, Division of Far Eastern Affairs, Department of State, and former Ambassador to the Netherlands

HAROLD LASSWELL, Ph.D., Yale Law School
EGON RANSFÖLEN-WERTHEIMER, Overseas Offices Division, United Nations

LEWIS H. ROHRBAUGH, Ph.D., Director, Graduate School, USDA

GEORGE L. RIDGEWAY, B.Litt., Director of Economic Research, International Business Machines Corporation, New York

LESLIE A. WHEELER, M.B.A., Counselor of Embassy, American Embassy, Mexico City, D. F., Mexico

CLAYTON E. WHIPPLE, M.S., Head, Public Agricultural Services Division, American Mission for Aid to Greece

FRANCIS O. WILCOX, Ph.D., Chief of Staff, Senate Foreign Relations Committee

The point has been reached in history where most aspects of government and life are parts of a wider international complex. Most of the major activities of modern life, such as production, trade and finance, communications, science and culture, have no independent national existence but are parts of a world wide system of relationships. No nations, not even the greatest water-isolated or land-locked states, are free from the possibility of physical attack in strength on their vital nerve centers and the masses of their population. Nor can any nation relax its constant vigilance to maintain the inner cohesion of its society against the disintegrating effects of psychological and political aggression through all modern channels of communication, including the infiltration of agents of foreign ideologies and political systems. Lack on the part of any people of a widespread and intelligent understanding of the international backgrounds and ramifications of the activities of almost every branch of the national government and economy is lack of a competence necessary not only to efficient work but also to survival in a competitive and unstable world.

These courses have been designed to give both the general international background, psychological, political and administrative, and the more specialized backgrounds in such fields as international trade, finance and agriculture.

The more specialized courses deal with world organization and administration, national defense, American foreign policies, the relations of the great powers and the special problem of the frontier zones between the powers occupied largely by non-self-governing peoples. On the economic side, courses are provided in international, financial and trade policies, and aspects of world agriculture, agricultural policies and world communications and transport.

INTERNATIONAL RELATIONS—LECTURE SERIES

In view of the great importance of foreign relations in the coming year, the Graduate School is planning to devote to this field three series of public lectures. These will be given by outstanding authorities in the different subjects presented. The aim of these lecture series will be to disentangle the factors of permanent importance from the mass of detail of merely passing interest. Special announcements regarding these three series (for which no fees will be charged) will be made early in the semester in which the series will be given.

The Foreign Policies—Past and Present—of the Great Powers

Fall Semester

H. DUNCAN HALL, Chairman

The USA: Major Trends—Past and Present—of Foreign Policy

Great Britain and the British Commonwealth—Past Policies and New Circumstances

French Foreign Policy Since the Revolution—Old and New Factors

The USSR—Major Historical Factors in the Foreign Policy of Russia

China—Foreign Relations and Policies

A series of lectures, planned for November and December 1948, to be given by outstanding experts from various countries. The aim will be to show in a broad survey the main historical trends in the foreign policies of the existing Great Powers. The lectures will show the links between present policies and persistent trends in national foreign policies in the past.

Economic Recovery and World Politics

Spring Semester

WALTER M. KOTSCHNIG, Chairman

World Economic Recovery

Recovery of Western Europe

Economic Development in Latin America

The Economic Outlook in Asia and the Far East

Soviet Policies and World Recovery

This series of lectures planned for the spring semester is designed to review, from the United States point of view, the basic

elements and considerations, especially those of a more permanent character, that determine post-war economic policies in the major regions of the world.

Latin America*

Fall Semester

ALBERTO LLERAS and WILLIAM SANDERS, Co-chairmen

Latin America: Contemporary Political and Social Forces
(factors of stability and change)

Economies of Latin America: Pending Questions (including development, industrialization, land conservation and ownership; self-help and foreign aid)

Culture: Indigenous and Acquired Values (cultural self-sufficiency vs. interdependence)

International Relations: Within the Western Hemisphere;
With Other States

The first three lectures will describe and explain contemporary political, social, economic and cultural developments in Latin America, in terms of their historical background, main characteristics and significant trends. The impact of these developments on traditional attitudes and institutions will be brought out. The last two lectures will consider these developments in the light of the international attitudes and policies of Latin American countries as reflected in their relations with each other, with the United States and with other states, both within and without the Organization of American States and the United Nations. The fallacy of the popular notion that the Latin American states constitute a homogeneous group and the misleading conclusions based on this notion will be shown.

230. Inter-American Problems

Fall, 2 credits

PHILIP LEONARD GREEN

This course examines basic inter-American problems, analyzes the interplay of significant economic and social forces which underlie these problems, then surveys methods and agencies through which the American states and their peoples are attempting to solve them. The course consists of lectures, reports, discussions and occasional participation by officials and others who are concerned with programs of inter-American collaboration.

525. The Application of Psychoanalytic Theory and Methods to Problems of International Relations

Year, 2 credits each semester (alternate years)

H. M. SPITZER

The first semester is devoted to fundamental concepts of psychoanalysis (structure of the psyche, instincts and their development, typical mechanisms)

* Presented jointly by the Pan American Union and the Graduate School.

and methods of psychoanalytical research. The second semester deals with applications of these methods to problems, mainly in the field of international relations, such as national character, propaganda, attitudes toward other nations.

The first part of the course consists of lectures and discussions; students receive a selected reading list to assist them in following the course. The second part is in seminar form; students prepare papers based on their own experience, and submit reviews of two books in this field. *Prerequisite:* Psychology of International Politics, or major in psychology or history, or equivalent experience approved by instructor. Course may be entered second semester with instructor's consent.

820. Seminar in American Foreign Relations, Policies and Practices

Spring, 3 credits (alternate years)

NELSON TRUSLER JOHNSON

Fundamental principles as developed in the conduct of our foreign relations from the Declaration of Independence up to the close of the free immigration period in 1925; significant subsequent developments through and following World War II, requiring us to accept and meet the responsibilities which go with our position among the nations.

United States Government organization for conducting its business with other governments. Factors which have played major roles in the development of foreign policy: commerce, international finance, shipping, fishing, agriculture, etc.; public opinion and the influence of media of mass communication; minority and pressure groups; etc. Implementation of foreign policy in peace and war, choice of people and machinery; informing other peoples about ourselves and how best to accomplish it. Need for effective coordination of our governmental machinery so as to identify and harmonize the needs and convictions of the whole American people in a united common action for the achievement of their ideals. Present methods of coordination. Other possible methods, including the Secretariat system. *Prerequisite:* Graduate study in the social sciences, or responsible administrative or supervisory experience, or approval of instructor.

428. Current Problems of World Politics

Summer, 2 credits

WESLEY M. GEWEHR

Structure of state system; nationality; sovereignty as the maximum area of agreement. "We the peoples of the United Nations." Conditions of peace and causes of war (conflicts of will, interests and ideas; desires for things incompatible with peace; political, economic and ideological aggressions; insecurity, etc.). State and private struggle for power on the economic plane. Raw materials, population, agriculture and food. Diplomacy; military organization; ideological manipulations (political and psychological warfare by use of channels of communications, such as speech, press, radio, etc.); attempts to maintain peace and reasons for failure. Facilitating international cooperation, political, economic, cultural; and mitigating conflict by means of international institutions, public and private.

745. The United Nations: Organization, Function, Prospects

Year, 2 credits each semester (alternate years)

HOWARD B. CALDERWOOD

A course especially designed to give government officials a broad and intimate view of the intermeshing of American policies, interests and machinery of government with the complex machinery of the new world organization. In analyzing the main features of that organization, its functioning and its problems, the course will aid in the understanding of the international side of the work of the various agencies of the United States Government. *Prerequisite:* An undergraduate degree in one of the social sciences, or responsible administrative or supervisory experience, or approval of instructor.

[815.] Seminar in National and International Policies Affecting Agriculture (1949-50 and alternate years)

[816.] World Communications and Transport (1949-50 and alternate years)

WILLIAM VAN ROYEN and SPECIAL LECTURERS

[817.] The Policies and Inter-Relations of the Great Powers —U.S.A., British Commonwealth and U.S.S.R. (1949-50 and alternate years)

H. DUNCAN HALL and OTHERS

430. Modern Russia

Fall, 2 credits

VALERY J. TERESHTENKO

Beginning with a brief summary of political, social and cultural life in Imperial Russia, the major emphasis will be on Russia since the Revolution: Soviet geography, ethnography and psychological characteristics of the Soviet people. Organization of the Soviet State and government; the Soviet Constitution. The Five-Year Plans. The agricultural, industrial, and banking systems. Trade, cooperatives, trade unions, social insurance. The Soviet educational system, art, music, the theatre, and ballet. Turning points in the Soviet history since 1917. International relations; USSR and the United States.

443. Contemporary Far East—China and Southeast Asia

Year, 2 credits each semester

CHU DJANG and CLARENCE HENDERSHOT

The first semester, under Dr. Hendershot, will be devoted to Southeast Asia and will consist of an analysis of current political and economic problems, against an historical background. Special emphasis on American interests in the area.

The second semester, under Dr. Djang, will be devoted to China. Beginning with an historical outline of Chinese diplomacy in relation to its neighbors and to the Western powers, the course will analyze major political, cultural and economic problems of modern China. Basic elements of Chinese society and the impact of the West on them will be discussed. *Prerequisite:* Some undergraduate work in the social sciences, or equivalent as approved by the instructors.

[432.] Modern Japan (1949-50 and alternate years)

JOSEPH G. YOSHIOKA

[440.] Problems of the Balkans and Middle East

CLAYTON E. WHIPPLE and AFIF I. TANNOUS

DIVISION OF COMMUNICATIONS AND TRANSPORTATION COMMUNICATIONS

[338.] Regulation of Communication

WALTER B. EMERY

[605.] Communications in Society (1949-50 and alternate years)

DALLAS W. SMYTHE

TRANSPORTATION

COMMITTEE ON TRANSPORTATION

DONALD E. CHURCH, Ph.D., Head, Transportation Section, Division of Marketing and Transportation Research, Bureau of Agricultural Economics, USDA

RUSSELL B. ADAMS, Member, Civil Aeronautics Board

FORD EDWARDS, Ph.D., Director, Bureau of Accounts and Cost Finding, Interstate Commerce Commission

WILLIAM C. CROW, M.A., Director, Marketing Facilities Branch, Production and Marketing Administration, USDA

MYLES E. ROBINSON, Ph.D., Economist, Air Transport Association of America

FREDERICK L. THOMSEN, Ph.D., Director Marketing Research Branch, Production and Marketing Administration, USDA

J. C. WINTER, Chief, Transportation Facilities Division, Marketing Facilities Branch, Production and Marketing Administration, USDA

The economic and social life of nations is directly affected by the availability, cost and quality of transportation service. The service is not only important to individual enterprises as a link in the process of obtaining supplies and reaching markets, but the type of economic activity of an area is dependent upon transportation. For example, specialized production areas and large markets could not exist without transportation. As an industry, transportation ranks among the largest in the nation; about 60 billion dollars are invested in transportation plant and equipment and over two million persons are employed by the industry.

The public interest in transportation is so vital that, about sixty years ago, railroad transportation was put under government regulation which has more recently been extended to motor, air and water carriers. The extent of regulation differs among the types of carriers and among the various state and federal agencies having regulatory responsibilities. Regulatory policies not only affect transportation agencies themselves but also create far-reaching influences throughout the economic system.

The courses offered in this field are designed to meet the specific needs of several types of students. Survey of Transportation is offered for persons working in other fields who wish to obtain a general understanding of transportation, and for persons who need a background for advanced work in this field. Economics of Transportation will be of interest to persons primarily interested in economic issues in general and those who need more intensive training in economic principles and public policy in this field.

Two courses will be useful to persons who need a better understanding of transportation rates and efficient traffic management from the shipper point of view. Both of these courses stress the practical aspects. For persons primarily interested in rates and rate structures, Transportation Rates and Rate Determination is suggested; while Traffic Management is recommended for persons who are primarily interested in the general phases of traffic management. Commercial Air Transportation is offered for persons

who wish to obtain a comprehensive knowledge of this rapidly expanding industry.

Current Economic Problems in Transportation deals intensively with a few of the more pressing problems, and appraises the relative merits of various possible means to remedy them. This course is aimed to meet the needs of persons who have had extensive training or experience in economic analysis and who have a general knowledge of transportation.

125. Transportation Rates and Rate Determination

Fall, 2 credits

ABBEFORD S. DOLCH

Topics to be treated include: commodity classification; use of traffic documents; rate principles and history of major rate adjustments; purposes of various forms of rates; tariff composition and regulations governing tariff publications; and rate structure and interpretation.

126. Traffic Management

Spring, 2 credits

JAMES F. PERRIN

Designed to acquaint transportation students with the principles and practices of traffic management from both Governmental and commercial points of view. Emphasis on functions of a traffic department, both industrial and Governmental, and on relations between carriers and traffic departments, with a considerable portion of the emphasis placed on transportation law. *Prerequisite:* Transportation Rates, or experience with rates and tariffs, or permission of instructor.

345. Survey of Transportation

Fall, 2 credits

DONALD E. CHURCH

A survey of transportation, types of carriers, and regulatory agencies. Deals briefly with the historical development of transportation and the relationship between transportation rates and the location of production and marketing centers; emphasis is placed upon regulatory policies and practices of the various agencies, cost and service characteristics of the various forms of transportation, establishment of rates and rate levels, and inter-carrier competition.

346. Economics of Transportation

Spring, 2 credits

DONALD E. CHURCH

Economic aspects of transportation from the point of view of carriers, shippers and the general public. Among the leading topics are the influence of costs, rates and service upon the location of production points and market centers; cost and service characteristics of the various types of transportation agencies, and the influence of those characteristics and "value of service" upon rates; imperfect competition among carriers and need for government regulation; and appraisal of the economic aspects of regulatory and promotional policies. *Prerequisite:* Survey of Transportation, or courses in economics, or permission of instructor.

438. Commercial Air Transportation

Fall, 3 credits

MYLES E. ROBINSON

A practical course in the organization, operation, and regulation of commercial air transportation. Both domestic and international phases will be covered, with primary emphasis on the former. The course will deal with the passenger, mail, express, and cargo activities of the air transport companies and will conclude with a survey of the extent and character of state and Federal regulation of the airline industry. *Prerequisite:* Principles of Economics, or equivalent as approved by instructor.

641. Current Economic Problems in Transportation

Fall, 2 credits

FRANK L. BARTON and SPECIALISTS

The most important current economic problems are reviewed briefly to obtain a general understanding of the present situation; a limited number of problems are selected for intensive analysis. Each student selects or is assigned a special problem or phase of a broad problem for careful analysis. In general, the issues and proposed solutions for a selected pressing problem will be presented by one or more specialists drawn from carrier or shipper organizations, Government agencies, practitioners or others directly interested in the specific problem. Following the presentation of the various points of view, roundtable discussions will be held to appraise the issues and solutions. *Prerequisite:* Advanced study in transportation or responsible employment in related fields.

DIVISION OF PSYCHOLOGY

The program of this division is for the most part composed of courses designed expressly to fit into curricula meeting the needs of a particular field or profession and is not intended to represent a progressive sequence in courses in psychology. For example, several courses are intended primarily for those concerned with some phase of personnel administration; two others constitute integral parts of the program in international relations. It remains, however, that the general or specialized study of the bases and methods of human motivation have implications and applications broader than any one field or profession.

400. Psychology of Human Relations

Fall, 2 credits. Repeated in Spring and Summer

HELEN PALLISTER

A course in practical psychology to give students an understanding of psychology of everyday life. It includes a study of basic principles of human behavior; why people behave as they do. It is designed to help the student understand other people better. This is not the usual course in introductory psychology but is designed for students who want a general basis in practical psychology.

500. Child and Adolescent Psychology

Fall, 2 credits

LILY BRUNSCHWIG

A course designed for those who want to understand the growth and development of children. It covers the period from infancy through adolescence and studies the physical, mental, and emotional development of the child. The course includes discussion of the process of physical and mental growth and resulting physical, social and emotional changes with particular reference to the period of puberty.

501. Social Psychology

Fall, 2 or 3 credits

DOUGLAS ENSMINGER

A general and introductory course on the social aspects of personality, social interaction and collective behavior. It includes treatments of cultural conditioning of personality, personality measurement, communication, public opinion, propaganda, censorship, mobs, riots, and social movements. An individual project is required for the third credit. *Prerequisite:* A course in general psychology or equivalent.

502. Rural Social Psychology

Spring, 2 credits

CARL C. TAYLOR, Assisted by PAULINE S. TAYLOR

A specialized course on the social psychology of rural people. Particular attention will be given to such topics as rural isolation, the reign of tradition and custom, farmers' public opinion, and farmers' movements. *Prerequisite:* A course in general psychology or equivalent.

503. The Conditions of Personality Growth

Spring, 2 credits (alternate years)

PATRICIA WOODWARD

This course treats the principal factors influencing personality development: physiological bases, infantile and childhood experiences, and cultural determinants. It considers both experimental and clinical contributions to the theory of personality and the application of those to practical problems of interpreting and dealing with people. *Prerequisite:* A course in general psychology or equivalent.

504. Personality Disorders

Fall, 2 credits (alternate years)

ALBERT C. CORNSWEET

This course through lectures and case discussion will deal with personality variations as seen among normal people, stressing the significance of such variation in social and occupational adjustment, and with major types of abnormal personalities with emphasis on recognition of these deviations. Designed to help meet the needs of placement officers, counselors and others who through interviews or other media must recognize and deal with problems of emotional maladjustment. *Prerequisite:* A course in general psychology or equivalent.

[505.] Principles of Interviewing (1949-50 and alternate years)

MARGARET E. BARRON, Assisted by HELEN SLOMAN PRYOR

[565.] Interview Workshop (1949-50 and alternate years)

MARGARET E. BARRON, Assisted by HELEN SLOMAN PRYOR

[520.] Introduction to Sociometry and Psychodrama

MARGARET E. BARRON

[739.] Psychological Foundations of Economics**DIVISION OF SOCIOLOGY****COMMITTEE ON SOCIOLOGY**

CARL C. TAYLOR, Ph.D., Chief, Division of Farm Population and Rural Life, Bureau of Agricultural Economics, USDA (Chairman)

HAROLD DORN, Ph.D., Statistical Coordinator, Division of Public Health Methods, United States Public Health Service, National Institute of Health, Federal Security Agency

JOHN PROVINSE
SAMUEL STAUFFER, Ph.D., Professor of Sociology, University of Chicago

CONRAD TAEUBER, Ph.D., Economist, Food and Agriculture Organization of the United Nations

CAROLINE WARE, Ph.D., Professor of Social Work, Howard University

OSCAR WEIGERT, JUR.D., Labor Economist, Office of Foreign Labor Conditions, Bureau of Labor Statistics, Department of Labor

Sociology consists of a description and analysis of group life or of the structure and functioning of social groups. There are thou-

sands of different kinds of social groups and every person lives in a number of different groups. Because of these facts all persons have extensive group experience. Few persons are, however, capable of analyzing the structure and functioning of groups, the interaction between individuals and groups, and the interactions between groups. It is out of these interactions that social problems arise and social planning is done, and out of them that personality mal-adjustments arise and personal development is accomplished. All sociology courses deal with either generalized or specialized descriptions and analyses of these interactions and the problems that arise out of them. The courses offered by this division are those which, it is felt, concern most directly the needs and interests of those served by the Graduate School.

215. General Sociology

Fall, 3 credits

ARTHUR F. RAPER

A basic and general study of social problems and processes with special emphasis upon such problems as population, race, poverty, crime, divorce, etc., and with special emphasis upon group processes such as organization, leadership, public opinion, etc.

506. Principles of Rural-Urban Sociology

Spring, 2 credits (alternate years)

NELS ANDERSON

A comparative study of rural and urban community life; of differences and interrelations between rural and urban cultures; of the influence each of these cultures may have upon the other, with special emphasis on rural and urban problems in the United States. *Prerequisite:* One course in sociology.

[507.] Farm Labor and Tenure Problems (1949-50 and every third year)

508. Agricultural Employment and Wages

Spring, 2 credits (alternate years)

LOUIS J. DUCOFF

A systematic treatment of patterns and trends in agricultural employment and wages with special attention to regional variations and agricultural-industrial interrelationships. Among the subjects covered will be problems of measurement of agricultural employment, the composition of the farm working force, agricultural wage structure and factors affecting wage levels, farm-nonfarm wage and income differentials, migration and the farm labor supply, problems of underemployment and implications for full employment policies. *Prerequisite:* One of following—one course in economics; Farm Labor and Tenure Problems; or consent of instructor.

[510.] Population (1949-50 and every third year)

CONRAD TAEUBER, Assisted by IRENE B. TAEUBER

[511.] Population Research Methods and Analysis (1949-50 and every third year)

MARGARET HAGOOD

[512.] Culture of Contemporary American Rural Life

CARL C. TAYLOR

[513.] Contemporary National Cultures

CARL C. TAYLOR

[514.] The Social Problems of Administration (1949-50 and alternate years)

JOHN PROVINSE

448. Sociology and Psychology of Group Relations

Spring, 3 credits

DOUGLAS ENSMINGER

A seminar-type course analyzing basic principles and processes of group formation, structure and functioning. Emphasis is on clinical analysis, demonstrations and review and application of research. The objective is to assist participants to develop a scientific attitude toward group relations and to evolve basic skills for improving group work in its various aspects—meetings, staff conferences, etc. Developed particularly for administrators, supervisors, teachers and leaders of community organizations. Two credits are for time in seminar; one credit for a project involving individual study and observation of functioning groups. *Prerequisite:* Background of work in sociology and psychology, or approval of instructor.

[515.] Rural Organization and Group Action (1949-50 and alternate years)

DOUGLAS ENSMINGER

[740.] Seminar in Rural Organization (1949-50 and alternate years)

DOUGLAS ENSMINGER

[516.] The Cultural Regions of the United States

CARL C. TAYLOR and ARTHUR F. RAPER

470. Introduction to General Semantics

Fall, 2 credits. Repeated in Spring

J. A. SAUNDERS

A study of this new methodology, the application of the investigative methods of the physical sciences, through extensional devices and techniques based on mathematical theory, to the social sciences, particularly individual and group relationships. Discussion of Korzybski's theories of human agreement, human progress, sanity and happiness. Applications of general semantics to case situations.

40. General Semantics Workshop

Year, non-credit

J. A. SAUNDERS

For persons wishing to continue their study of general semantics and extensional methods of evaluation, particularly as focused on case situations. The workshop will include: practical exercises in applying principles of general semantics to everyday personal and professional problems; information exchange on practical applications made by participants; study of practical applications made by other groups and individuals; laboratory training in applying extension techniques to change our "minds," to keep concepts current, and to employ democratic procedures and extensional evaluation methods in reaching agreements. *Prerequisite:* Introduction to General Semantics or equivalent or approval of instructor.

[495.] Advanced General Semantics

J. A. SAUNDERS

Department of Technology

DEPARTMENTAL COMMITTEE

F. J. SETTE, M.S., Assistant Director, Programs Division, Research and Development Board (Chairman)

THOMAS B. CHAMBERS, C.E., Chief, Engineering Division, Soil Conservation Service, USDA (Vice-chairman)

R. G. HAINSWORTH, M.A., Principal Economic Geographer, Office of Foreign Agricultural Relations, USDA

WILLIS S. MACLEOD, I.M.E., Deputy Director, Bureau of Federal Supply, Treasury Department

WILLIAM R. OSGOOD, Ph.D., Mechanical Engineer, Structural Mechanics Division, David Taylor Model Basin, Department of the Navy

ROBERT W. TRULLINGER, C.E., Assistant Administrator and Chief, Office of Experiment Stations, Agricultural Research Administration, USDA

GILBERT S. UNDERWOOD, M.A., Supervising Architect, Public Buildings Administration, Federal Works Agency

FAYETTE S. WARNER, Ph.D., Engineer-Economist, Federal Power Commission

MARSHALL S. WRIGHT, Technical Assistant to the Chief, Office of Plant and Operations, USDA

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For more than ten years, the various departments and agencies of the Federal Government have been engaged in extensive programs of conserving natural resources and raising the standards of living and welfare in urban and rural areas. These programs have been translated into specific projects involving flood control, soil conservation, power development, rural electrification, industrial hygiene, housing and a number of related activities. Preparation for defense and later production for war involved expansion of the existing industrial plant and, when access to raw materials was prohibited by enemy action, the development of new facilities for the manufacture of substitute materials. All these governmental actions have involved in varying degrees engineering techniques and engineering personnel.

Basically, education in engineering schools, limited by necessity and tradition to a period of four years, is mainly technical. In this short period, barely sufficient to assimilate and master a minimum of the basic sciences, there is little room for courses to supply the engineering student with background in the social and economic world about him so that he may understand the impact of the advances of his profession upon society. Moreover, developments in the sciences and in engineering require enlarging of the engineer's technical background.

Mindful of these limitations of engineering education and of the engineer's place in modern society, the Graduate School, working together with representatives of the various Government departments and of the local chapters of engineering societies, offers courses intended to add to the technical, administrative and professional background of engineers in the service of the Federal Government.

The Department of Technology also offers a number of courses in those skills basic to engineering operations which will be of assistance to the engineer, the applied scientist and the non-engineer desiring to broaden his background.

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Course Numbers and Symbols—Below 100, non-credit; 100–399, undergraduate; 400–699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

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DIVISION OF ENGINEERING

THOMAS B. CHAMBERS (Chairman)

475. Naval Architecture

Year, 2 credits each semester

CHARLES L. WRIGHT

First semester: Determination of principal dimensions of a ship; development of ship lines; displacement and stability calculations; launching.

Second semester: Trochoidal wave theory; action of ships in waves; hull form and resistance; power; propulsion, steering.

Prerequisite: Completion of junior year in a school of engineering or equivalent experience.

476. Ship Construction

Year, 2 credits each semester

CHARLES L. WRIGHT

First semester: Shipyard organization; calculations of weight and strength of ships; riveted and welded construction; design of structural parts.

Second semester: Arrangement of machinery and fittings; piping, wiring, and ventilation; load line regulations, tonnage measurement, trial trips, dry docks.

Prerequisite: Completion of junior year in a school of engineering or equivalent experience.

402. Principles and Practice of Refrigeration

Fall, 2 credits

HARRY L. GARVER

Includes a study of: types of mechanical equipment, power, controls, evaporators, condensers, insulation and heat transfer, characteristics of refrigerants and eutectic solutions; refrigeration requirements for different foods; management of storages; and refrigerated transportation. *Prerequisite:* Physics, algebra, trigonometry, and analytic geometry.

403. Principles of Air Conditioning

Spring, 2 credits

RICHARD S. DILL

Different methods and processes of air conditioning as applied to homes, offices, warehouses, factories, etc. A discussion of underlying principles based on thermodynamics and mechanical engineering procedures and study of air conditioning installations. *Prerequisite:* Thermodynamics, or completion of junior year in Mechanical Engineering, or Principles and Practice of Refrigeration or equivalent.

501. Transmission and Distribution Systems for Area Electrification

Fall, 3 credits

EDWARD P. EARDLEY

Study of electrical and mechanical characteristics of lines used in the transmission and distribution of power; the operation of such systems; the economic principles on which design rests. *Prerequisite:* Degree in engineering or equivalent experience.

700. Analysis of Rigid Frames

Year, 2 credits each semester (alternate years)

A. AMIRIKIAN

The first semester covers the fundamentals of slope-deflection and the analysis of continuous beams and rectangular frames. Subjects will include: curvature; deflection angle; deflection; conjugate beam; sign convention; fixed-end moments; slope deflection; frames without sway—direct method of solution, solution of approximations; frames involving sway—rectangular bents.

The second semester covers the analysis of complex frames of various outline, secondary stresses, and semirigid framing. Subjects will include: trapezoidal bents; vierendeel bents; gable bents; lean-to bents; hip bents; bents of irregular outline; secondary stresses; semirigid framing. *Prerequisite:* One of the following: Bachelor of Science in Civil Engineering; several years of structural design experience; experience required for an assistant engineer, P-2.

[520.] Theory and Design of Welded Structures (1949-50 and alternate years)

NATHAN W. MORGAN

[702.] Electric Utility Engineering (1949-50 and alternate years)

J. J. A. JESSEL

310. Aerodynamics

Year, 2 credits each semester

MAURICE E. LONG

First semester: Fluid flow, wing theory, airfoil characteristics, wind-tunnel tests, stability, drag data. Lectures, discussions, and problems.

Second semester: Engine and propeller considerations, performance calculations, special problems. *Prerequisite:* Physics, algebra and trigonometry.

301. Soil Mechanics

Year, 3 credits each semester

EDWARD S. BARBER

Theory and practical applications of soil mechanics to the engineering problems of foundations, dams and embankments. Course designed to familiarize general engineers with problems connected with soils and methods of foundation investigation and laboratory tests available for solving these problems. Foundation investigation methods described include: core drilling, auger boring, test pit digging, record keeping and collection and protection of samples. Laboratory tests to be described include: general classification, permeability, consolidation, compaction, shear and triaxial compression. Laboratory facilities are available for demonstration. *Prerequisite:* College Physics.

542. Mechanical Vibrations

Year, 2 credits each semester (alternate years)

ALBERT LONDON

Background mathematics. Harmonic oscillator. Free and forced vibration. Electric circuit analogies. Vibration pickups. Vibration isolation. Normal modes. General laws. Reciprocity principle. The Lagrangian. Rayleigh-Ritz method. Strings. Bars. Membranes. Plates. Critical speeds. Stability. Non-linear systems. *Prerequisite:* Calculus and Mechanics.

[552.] Modern Engineering Materials (1949-50 and alternate years)

WILLIS S. MACLEOD and Commodity Experts

553. Engineering in Materials Supply Operations

Fall, 2 credits

WILLIS S. MACLEOD

Engineering operations essential to effective materials and equipment supply in respect to construction of plant, manufacturing and maintenance of operations and from the Government's viewpoint of supply as a non-producing operation. The course covers the fields of designing, listing, requirements of purchasing officers for inquiry and allocation of contract awards, distribution and warehousing, use application and serviceability, reclamation and surplus, and those engineering phases of classification, item identification and standardization of the most serviceable and economical items for specified end uses. *Prerequisite:* Engineering degree or equivalent or consent of the instructor.

554. Protecting Engineering and Scientific Developments Through Patents

Spring, 2 credits

ALBERT J. KRAMER

This course is intended to supply the need of engineers and scientists for practical information concerning inventions and patents. Beginning with a discussion of the need of patent protection in our competitive economy, the course will cover: a review of the United States patent system; the steps that an inventor should take to protect his invention; analyses of some important historical patents; how to interpret patents for novelty and infringement; how patents, trade marks, and copyrights are distinguished; what rights employees and employers have to inventions made by the employees; how patent rights may be dealt with; how to determine inventorship among co-workers; how to determine patent priorities between independent inventors; the elements of inventive intelligence; and other matters of particular importance to engineers and scientists, especially those in the Government service. *Prerequisite:* Degree in one of the sciences, or equivalent, or consent of the instructor.

DIVISION OF SURVEYING AND MAPPING

COMMITTEE ON SURVEYING AND MAPPING

MARSHALL S. WRIGHT (Chairman)

WARREN C. CRUMP, C.E., Deputy Chief Engineer, Hydrographic Office, Department of the Navy
 GEORGE H. EVERETT, C.E., Cartographic Engineer, U. S. Coast and Geodetic Survey, Department of Commerce
 W. S. HIGGINSON, M.A., Unit Supervisor, Photogrammetric Section, U. S. Geological Survey, Department of Interior
 J. E. KING, Cartographic Engineer in Charge of Surveys and Maps, Forest Service, USDA
 GUILLERMO MEDINA, C.E., Chief Engineer, Hydrographic Office, Department of the Navy
 ALBERT L. NOWICKI, C.E., Assistant Chief, Operations and Planning Staff, Army Map Service, Department of the Army
 HOWARD S. RAPPLEYE, Principal Mathematician, Chief, Section of Leveling, U. S. Coast and Geodetic Survey, Department of Commerce

A. L. SHALOWITZ, LL.M., Chief, Section of Research, Review and Technical Information, U. S. Coast and Geodetic Survey, Department of Commerce
 G. C. TEWINKEL, M.C.E. Photogrammetrist, Division of Photogrammetry, U. S. Coast and Geodetic Survey, Department of Commerce
 PAUL D. THOMAS, M.S., Mathematician, U. S. Coast and Geodetic Survey, Department of Commerce
 H. W. WHITLOCK, C.E., Engineer in Charge of Cartography, Soils Survey Division, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA
 ARCHER M. WILSON, Chief, Shoran Section, Photogrammetric Branch, Research and Development Laboratory, Department of the Army

Maps have played an important part in human progress. Today, as never before, they furnish the basis for both military and non-military activities throughout the world. Greater use of maps has brought increasing demand for persons qualified in each of the technical phases of map production and reproduction.

The purpose of the curriculum in surveying and mapping is to offer basic training for those persons who are engaged in the technical and supervisory aspects of map making. The curriculum is intended to give the student a broad knowledge and basic understanding of each of the separate phases of the science; to enable him to understand better the problems, possibilities, and limitations of each of the phases. He can then better plan his own activities toward the economical production of accurate maps. A large part of the curriculum is devoted to geodesy, a subject considered to be of increasing importance in view of modern rapid means of world-wide travel, the consequent need for world-wide charts, and the development of new methods in surveying.

At least two years' work toward a degree of Bachelor of Science in Civil Engineering is considered as being the logical background for the curriculum in surveying and mapping, although one who has completed the sophomore year in engineering normally would have fulfilled the usual prerequisites. Many other potential students will also find that they may have already fulfilled all or nearly all the prerequisite studies. It should be emphasized that Calculus and College Physics are desirable prerequisites for advanced courses. Persons who are planning a career in this field are urged to arrange their schedules so as to include these courses at the earliest opportunity.

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[215.] Route Surveying (1950-51 and every third year)

HOWARD S. RAPPLEYE

[216.] Ground Methods of Topographic Surveying (1950-51 and every third year)

HOWARD S. RAPPLEYE

217. Astronomy for Engineers

Spring, 3 credits (every third year)

HOWARD S. RAPPLEYE

The fundamentals of the circular systems; basis of the determination of time, longitude, latitude and azimuth; the use of instrumental equipment such as altazimuth instrument, zenith telescope, meridian transit, sextant, astrolabe, zenith camera. Lectures, classroom work and field work. *Prerequisite:* Ground Methods of Topographic Surveying or equivalent or permission of the instructor.

[218.] Geodetic Surveying (1949-50 and every third year)

HOWARD S. RAPPLEYE

[219.] Computation and Adjustment of Geodetic Observations (1949-50 and every third year)

HOWARD S. RAPPLEYE

212. Photogrammetry I

Fall, 2 credits

W. S. HIGGINSON

Basic optics; basic geometric characteristics of aerial photographs; flight planning; basic photography and laboratory practices; photographic materials; aerial cameras; camera mounts. *Prerequisite:* Plane Trigonometry.

213. Photogrammetry II

Spring, 2 credits

W. S. HIGGINSON

Radial line plotting methods, mosaics, determination of elevations from photographs, photo-interpretation. *Prerequisite:* Photogrammetry I.

[370.] Photogrammetry III (1949-50 and alternate years)

G. C. TEWINKEL

[371.] Photogrammetry IV (1949-50 and alternate years)

G. C. TEWINKEL

214. Cartography

Year, 2 credits each semester

GEORGE H. EVERETT

Includes a study of maps and charts and certain aspects of surveying that are necessary for their proper understanding. Covers a review of the fundamental problems involved in constructing a scientific map; developments and progress in the past which have contributed to our present fund of cartographic knowledge and practices. The basic problems of modern civilization that require the use of maps will be considered in a study of the various types of maps and charts now published. Various methods used in obtaining the field data and interpreting the data for mapping or charting purposes. Problems involved in the compilation of the data into a map or chart to meet required specifications. Class problems will employ the use of special tables for constructing projections, computing positions and for computing the rectangular grid systems as employed by the Corps of Engineers in their surveys. *Prerequisite:* Plane Trigonometry.

240. Methods of Map Reproduction

Spring, 2 credits (alternate years)

M. S. A. DELANEY and Specialists

Photography including wet plate, dry plate and film; photostat, ozalid, blueprint, etc.; process plate making including plastics; negative engraving and lithographic drafting; transferring; type composition for maps; copper plate engraving and plate printing; presswork, single and multicolor; layout and film assembly; inks and papers; binding and finishing. Lectures by lithographic experts from government and industry.

430. Map Projections

Fall, 2 credits (alternate years)

(To be announced)

Clarification, choice and properties of map projections; the application of the theory of map projections for determining the basic relations that will pro-

duce a projection of desired properties; technique of computing a special projection table; technique of constructing projections; great circles and rhumb lines; the mercator, gnomonic, polyconic, Lambert conformal, stereographic and other projections in common use; military, domestic and foreign grid systems.
Prerequisite: Calculus.

[440.] Theory of Geodesy (1949-50 and alternate years)

PAUL D. THOMAS

Prerequisite: Calculus and the following courses in Technology: 217, 218 and 219 or equivalent.

DIVISION OF FINE ARTS AND ARCHITECTURE

GILBERT STANLEY UNDERWOOD (Chairman)

322. Survey of Art

Fall, 2 credits

CHARLES M. RICHARDS

The course is designed to establish the basic values which underlie artistic achievement and to develop an appreciation of these values before the objects themselves. From age to age these basic values—the aesthetic values—remain the same. The lectures will attempt to relate the major epochs to one another so as to indicate the continuity of art history and at the same time contrast the variant forces and ideas which produced such differing styles and expressions.

334. Modern Painting

Spring, 2 credits

CHARLES M. RICHARDS

This course begins with a study of the art of the outstanding masters of the 17th Century and of the general current of painting in that century, with emphasis on the development of painting through the National Schools and styles up to the present moment. The main concern will be to arrive at an understanding and appreciation of impressionism and post-impressionism.

321. Pencil Sketching and Freehand Drawing

Fall, 2 credits. Repeated in Spring and Summer

WALTER G. CADMUS, JR.
ROWLAND LYON

Study of shade, shadows, and perspective. An intensive study of theory, harmony of lines, and pictorial and outdoor sketching. Each student receives individual criticism. Open to both beginners and advanced students.

323. Portrait Painting in Oil

Fall, 2 credits. Repeated in Spring and Summer

PIETRO LAZZARI

To enjoy this course the student need not have experience as an artist but must have the desire to achieve proficiency in portraiture.

Professional methods of painting oil portraits incorporating the basic techniques of the old masters and the spirit of modern art. Course includes, sketching, line composition and light arrangement; color, theory and technique of painting in oil. All work done from life.

320. Water Color Painting

Fall, 2 credits. Repeated in Spring

ROWLAND LYON

Theory and practice; painting from landscape and still life.

230. Home Decoration

Fall, 1 credit. Repeated in Summer

HARRIET GARRELS

Principles of arrangement; making the most of what we have; color; walls; window treatments; floor coverings. For amateurs and homemakers.

231. Home Decoration—Furniture

Spring, 1 credit

HARRIET GARRELS

Furniture woods, American and English furniture styles, contemporary furniture. For amateurs and homemakers.

232. Home Decoration—Accessories

Fall, 1 credit

HARRIET GARRELS

Textiles, lighting, pictures, flower arrangement, Oriental rugs. For amateurs and homemakers.

233. Home Decoration—Modern

Spring, 1 credit

HARRIET GARRELS

Architectural backgrounds. Evolution and characteristics of most recent decorative trends; furniture and materials; arrangement. For amateurs and homemakers.

316. Landscape Development of the Small Property

Fall, 2 credits

JOSEPH C. GARDNER

The purpose of this course is to encourage and direct the creative impulse of the person interested in the landscape development of the small property, thus creating more interest and pleasure in the home. The course will include an outline of the basic principles of land planning and their application to the design of the small property, with discussion of the principles of composition in relation to the selection and use of plants and other materials. The practical application of landscape design principles to specific problems. A discussion of the physical aspects of landscape development including construction methods, horticultural standards and maintenance requirements. Each member of the class will be required to submit a statement concerning his program for the plan and development of his property or property of his selection.

**[318.] City Planning and Urban Development (1949-50
and alternate years)**

S. E. SANDERS

324. Basic Mechanical Drawing I

Fall, 2 credits

LEO G. D. WIEMER

The use of drawing instruments. Lettering and dimensioning. Problems in conventional presentation of objects by means of lines, including geometrical problems, orthographic projection and auxiliary projection. One hour lecture and three hours drafting room work each week.

325. Basic Mechanical Drawing II

Spring, 2 credits

LEO G. D. WIEMER

Advanced instruction in the elements taught in Basic Mechanical Drawing I. Developments and intersections. One hour lecture and three hours drafting room work each week. *Prerequisite:* Basic Mechanical Drawing I or equivalent.

340. Architectural Drafting I

Fall, 2 credits

LEO G. D. WIEMER

Frame house construction. Study of wood framing and related building materials; arrangement of rooms and furniture; the economy of good construction. Drawing of plans and elevations of a frame residence from sketches. One hour lecture and discussion and three hours drafting room work each week. *Prerequisite:* Basic Mechanical Drawing II or equivalent.

341. Architectural Drafting II

Spring, 2 credits

LEO G. D. WIEMER

Large scale drawing of exterior and interior details for the frame residence studied in Architectural Drafting I. One hour lecture and discussion and three hours drafting room work each week. *Prerequisite:* Architectural Drafting I or equivalent.

342. Architectural Drafting III

Fall, 2 credits

LEO G. D. WIEMER

Study of masonry construction and related building materials. Site plan study and drawing. Preparation of plans and elevations of a masonry building from sketches. One hour lecture and discussion and three hours drafting room work each week. *Prerequisite:* Architectural Drafting II or equivalent.

343. Architectural Drafting IV

Spring, 2 credits

LEO G. D. WIEMER

Large scale drawing of exterior and interior details for the masonry building studied in Architectural Drafting III. Outline study of the Orders of Architecture. One hour lecture and discussion and three hours drafting room work each week. *Prerequisite:* Architectural Drafting III or equivalent.

305. Elements of Statistical Drafting

Fall, 2 credits

NELSON P. GUIDRY

A practical course in drafting involving actual preparation of statistical maps and charts in class. Explanations of short cut methods of lettering technique and arrangement of component parts of illustrations. Comparability and evaluation of individual charts and maps in a series will be analyzed. Complete illustrations will be prepared in ink ready for publication. The reduction, reproduction, and color application to statistical maps and charts will be explained.

DIVISION OF TECHNICAL ARTS

R. G. HAINSWORTH (Chairman)

188. Glass Blowing

Year, 2 credits each semester

L. B. CLARK

WILLIAM W. CAMPBELL, JR.

A laboratory course for technicians. Simple manipulation of joining, bending, and shaping is carried through to the production of useful apparatus. Metal in glass and glass to metal seals of all types are made. During the first semester the soft glasses are utilized for practice; during the second semester the related glasses are used. Ample opportunity for advanced work is given those who show themselves particularly adapted to the work. (New students may be admitted in the Spring if space permits.)

329. Home Gardening

Spring, 2 credits

WILBUR H. YOUNGMAN

A lecture and discussion course designed to present the fundamentals of gardening for the amateur. Beginning with a discussion of design, the course

briefly covers the preparation of soil, selection of plant materials, planting, cultural practices, protection from insects and diseases, pruning, and propagation of shrubs, perennials and annuals for the home garden. The home production of vegetables and fruits will be discussed briefly with emphasis on culture under Washington conditions.

COMMITTEE ON PHOTOGRAPHY

R. G. HAINSWORTH (Chairman)

IVON H. BLACKMAN, JR.	JAMES H. MCCORMICK, M.S., Assistant Director, Office of Information, USDA
EDWARD S. COBB, Head, Specifications and Tests, Research and Development Department, Naval Photographic Center, Department of the Navy	ELBRIDGE C. PURDY, Chief, Photographic Section, Photographic and Duplicating Services Division, Office of Plant and Operations, USDA
RAYMOND DAVIS, Chief, Photographic Technology Section, National Bureau of Standards, Department of Commerce	Roy M. REEVE, Deputy Chief, Army Medical Illustration Service, Army Institute of Pathology, Department of the Army
P. J. DALY, P.A.B., District Manager, Washington Office, Ansco Division, General Aniline and Film Corporation	WILL H. TOWLES, Master Photographer, Past President, Photographers' Association of America and former Director of the Association's School
R. J. LEFEBVRE, B.C., Chief, GPO-Department of State Service Office, Department of State	LYNN R. WICKLAND, Chief, Reproduction Division, Army Map Service, Department of the Army
KEITH B. LEWIS, A.B., Manager, Government Sales Division, Washington Office, Eastman Kodak Company	
ALBERT R. MATERAZZI, D.Ch., Graphic Arts Specialist, Aeronautical Chart Service, Department of the Air Force	

70. Popular Photography

Fall, non-credit. Repeated in Spring and Summer

GEORGE F. JOHNSTON

This is a lecture, demonstration course of a non-technical nature. It is intended particularly for those camera enthusiasts who desire a clearer understanding of how their cameras, films and prints work. Better pictures should be the result of taking this course. Topics covered: camera types and operation; popular film types and uses; filters; judging exposure; planning pictures and composition; lighting, natural and artificial; posing hints; taking action pictures and hints on the use of color film.

192. Fundamentals of Photography I

Fall, 2 credits. Repeated in Spring

ROBERT A. KOCH

This course forms a foundation for all of the other courses in photography. It offers a thorough grounding in elementary optics, physics, chemistry and composition as related to basic photographic operations. Topics covered: lenses, their make-up and function; characteristics of negative emulsions and printing papers; methods of correct exposure; the theory of development; fixing and washing processes; fundamental concepts of composition; and principles and uses of filters.

193. Practice of Photography I

Fall, 2 credits. Repeated in Spring and Summer

ELBRIDGE C. PURDY

This course furnishes laboratory practice and demonstration of the principles taught in Fundamentals of Photography I. It offers the student an opportunity to become familiar with recommended procedures and techniques. Topics covered: contact printing and processing; selection of printing papers; processing of negative roll film, cut film and film pack; diagnosis and remedy of processing defects; types of cameras, their operation and uses, and the application of filters. This course may be taken concurrently with Fundamentals of Photography I. *Prerequisite:* Fundamentals of Photography I.

194. Fundamentals of Photography II

Fall, 2 credits. Repeated in Spring

EDWARD S. COBB

A continuation of Fundamentals of Photography I. Subjects included are: practical sensitometry and gradation control; the theory of projection printing; line and mass in picture arrangement; the nature of photographic light, its characteristics, control and measurement; shutter types and their performance; chemistry of photographic processes and the use of color film. *Prerequisite:* Fundamentals of Photography I.

195. Practice of Photography II

Fall, 2 credits. Repeated in Spring

JAMES A. BEALES
ELBRIDGE C. PURDY

A continuation of Practice of Photography I. Subjects included are: application of sensitometric measurements, projection printing, print correction, composite printing, lighting, rendition of form and texture, light patterns, principles of portraiture, the effect of light on color, retouching, toning and print analysis. *Prerequisite:* Practice of Photography I.

307. Color Photography—Theory

Spring, 2 credits

ALBERT R. MATERAZZI

Designed to cover the general development of color photography and to acquaint the student with current advances and discoveries. Includes: colorimetry; subjective and objective color reproduction; color cameras; emulsions; tripacks, bipacks and monopacks; Kodachrome and Dye Transfer; Ansco Color and Printon; screen plates and lenticular process; separation negatives; masking; toning; primary color and coupling development; Gaspar color process; carbro process; and Diazo and bleach-out photography. *Prerequisite:* Fundamentals of Photography II or equivalent or comparable photographic experience approved by instructor.

308. Color Photography—Practice

Fall, 2 credits. Repeated in Spring

HARVEY B. MOHR

A laboratory course in the application of color reproduction theory to color photography. Includes: spectral transmission of filters; sensitivity of emulsions; color separations; color printing processes; multilayer film and printing materials; and dye processes. *Prerequisite:* Color Photography—Theory, and Practice of Photography II, or comparable practical photographic experience as approved by instructor.

360. Portrait Photography

Year, 2 credits each semester

ELBRIDGE C. PURDY

A studio and darkroom course that provides opportunity for practice. The student learns through individual guidance the subtleties of fine portrait work. Lighting, posing, composition, processing and re-touching. *Prerequisite:* Practice of Photography II.

Faculty

LAURENCE W. ACKER, C.P.A. Chief, Division of Accounting, Office of Budget and Finance, USDA. Taught in Tyler Commercial College. (Public Administration)

SIDNEY J. ADAMS, LL.B., Columbus. Administrative Officer, Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, USDA. (Office Techniques)

BUSHROD W. ALLIN, Ph.D., Wisconsin. Chairman, Outlook and Situation Board, Bureau of Agricultural Economics, USDA. Taught in Wisconsin. (Social Sciences)

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A. AMIRIKIAN, C.E., Cornell. Head Designing Engineer, Bureau of Yards and Docks, Navy Department. Taught in Catholic and George Washington. (Technology)

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CONSUELO BATISTA, Secretary, Cuban Embassy. Taught in Escuela Normal para Maestras, Havana. (Languages and Literature)

MAGNA E. BAUER, Auguste Victoria Lyzeum, Berlin. Translator, Historical Division, Special Staff, Department of the Army. (Languages and Literature)

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WILLIAM B. GROGAN, LL.M., Georgetown. Technical Assistant to the Administrator, Wage and Hour and Public Contracts Division, Department of Labor. Taught in Catholic. (Social Sciences)

NELSON P. GUIDRY, Cartographer, Office of Foreign Agricultural Relations, USDA. (Mathematics and Statistics and Technology)

KARL HABEL, M.D., Jefferson Medical College. Chief, Neurotropic Virus Unit, National Institute of Health, U. S. Public Health Service, Federal Security Agency. Taught in University of Pennsylvania Medical School. (Biological Sciences)

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TYLER F. HAYGOOD, Ph.D., Wisconsin. Principal Economist, In Charge of Tax Section, Division of Agricultural Finance, Bureau of Agricultural Economics, USDA. Taught in Illinois, Wisconsin, Louisville, and West Virginia. (Social Sciences)

CANNON C. HEARNE, M.S., Wisconsin. In Charge, Training Section, Division of Field Studies and Training, Extension Service, USDA. Taught in Missouri. (Social Sciences)

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WALTER A. HENDRICKS, M.A., George Washington. In Charge, Methodology Section, Agricultural Estimates, Bureau of Agricultural Economics, USDA. Taught in North Carolina State. (Mathematics and Statistics)

- H. T. HERRICK, C.E., Columbia. Special Assistant to the Chief of Bureau, Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, USDA. (Biological Sciences)
- THOMAS J. HICKEY, LL.M., Columbus University. Deputy Fiscal Director, Finance Division, Bureau of Medicine and Surgery, Department of the Navy. (Office Techniques)
- W. S. HIGGINSON, M.A., Utah. Unit Supervisor, Photogrammetric Section, U. S. Geological Survey, Department of Interior. Taught in George Washington. (Technology)
- ROBERT L. HILL, A.B., Washington. Head, Salary Administration Section, Division of Classification, Office of Personnel, USDA. (Public Administration)
- DELIGHT WILLIAMSON HOLT, B.S., Columbia. Instructor, Speech Department, George Washington University. Taught in Maryland, Trinity University, and Westminster Choir College. (Languages and Literature)
- WARNER H. HORD, M.B.A., Harvard. Chief, Accounting and Rates Division, Civil Aeronautics Board. Taught in Tulane. (Public Administration)
- JOHN KEITH HORSEFIELD, B.A., Bristol. Assistant Chief of Financial Division, International Monetary Fund. Taught in London. Author: "The Real Cost of War." (Social Sciences)
- DONALD C. HORTON, Ph.D., Michigan. Principal Economist, Head of Mortgage Credit Section, Division of Agricultural Finance, Bureau of Agricultural Economics, USDA. Taught in Brown, Michigan, and Ohio State. (Social Sciences)
- H. BURKE HORTON, M.B.A., Texas. Transportation Analyst, Interstate Commerce Commission. Taught in Texas. (Mathematics and Statistics)
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- WALTER JACOBS, M.A., George Washington. Chief of Production and Market Section, Department of Commerce. Taught in George Washington. (Mathematics and Statistics)
- WOODROW C. JACOBS, Ph.D., California. Assistant Chief, Division of Climatological and Hydrologic Services, Weather Bureau, Department of Commerce. (Physical Sciences)
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